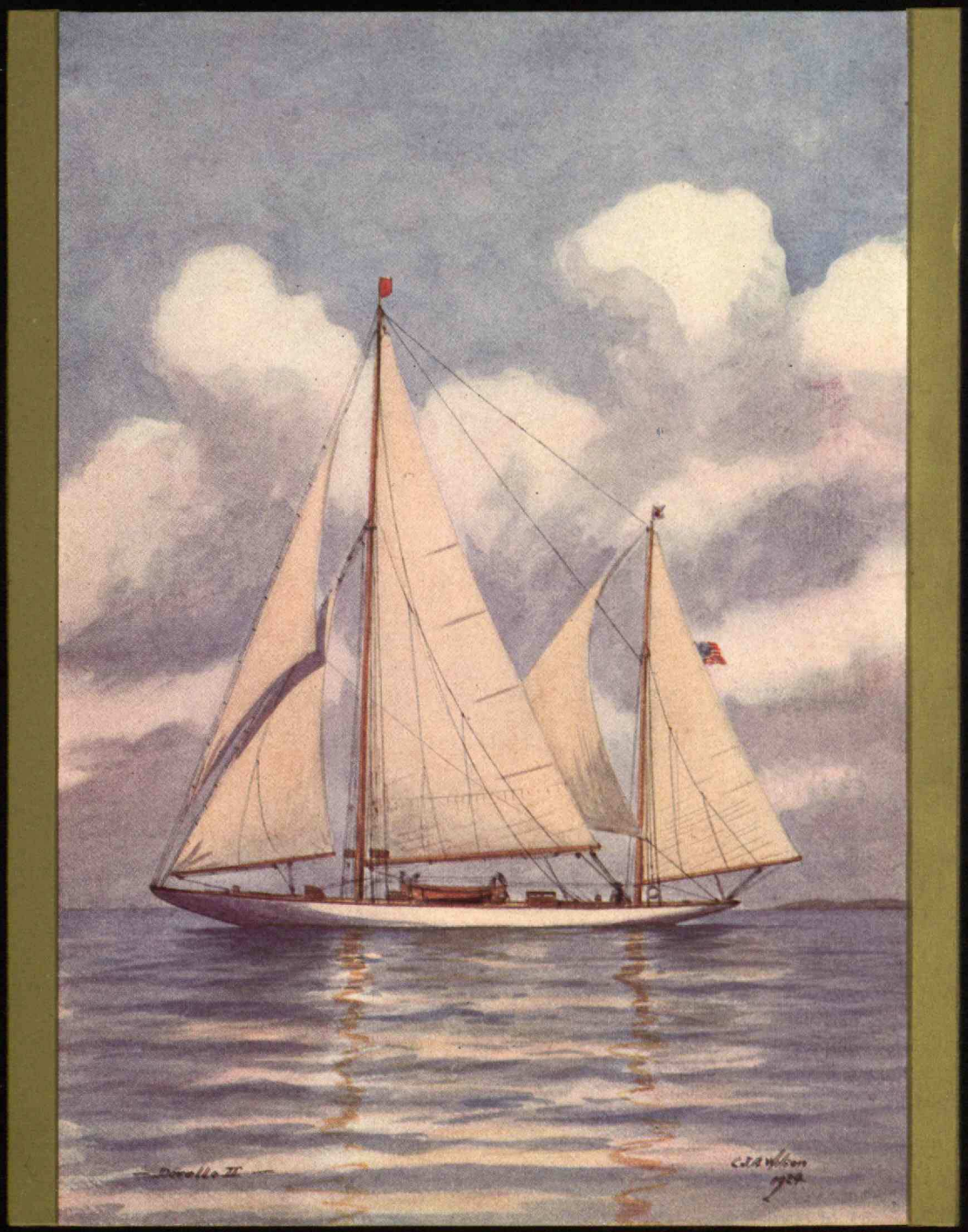
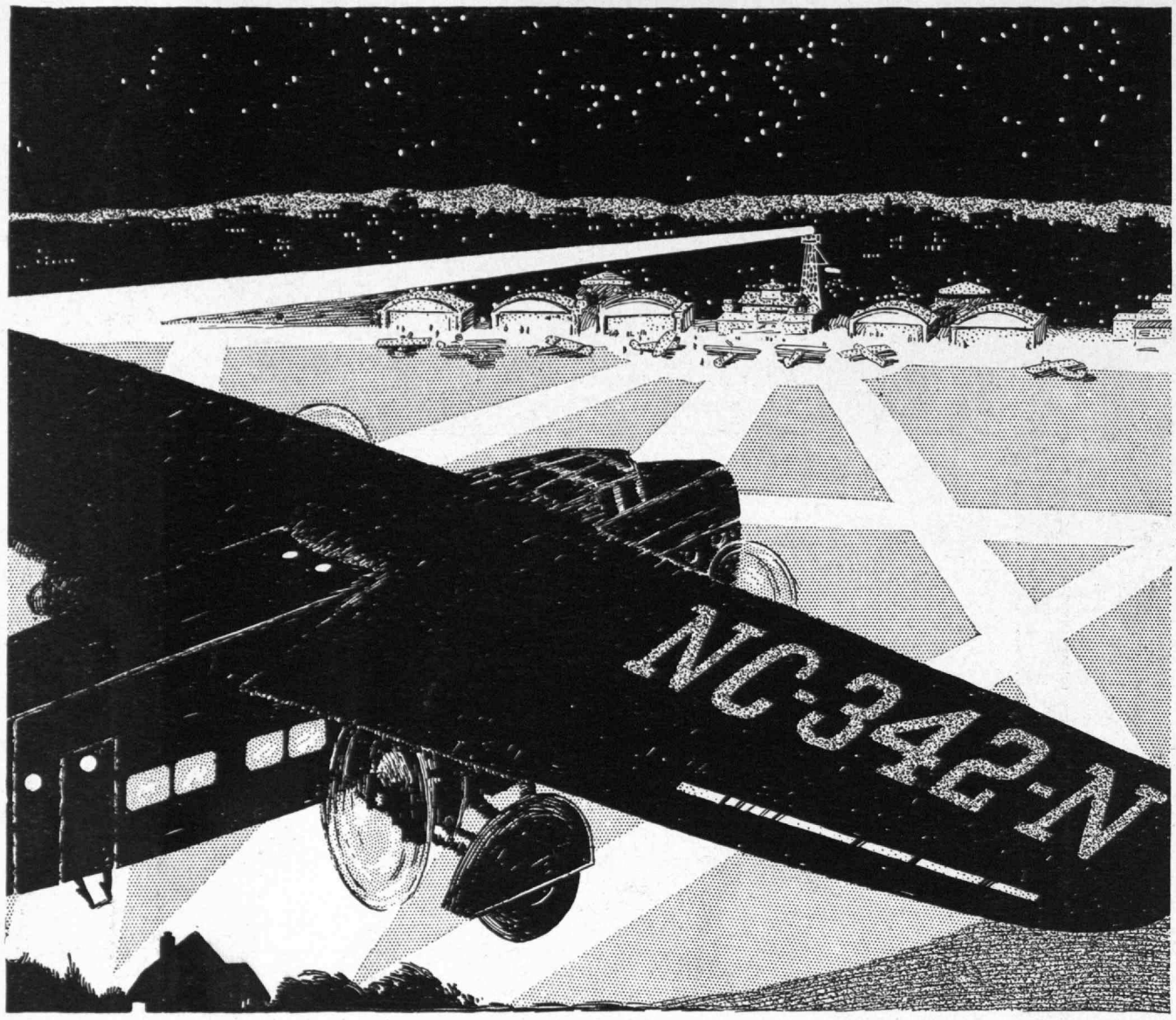
THE TECHNOLOGY REVIEW

NOVEMBER 1930



technology
review
Published by MIT

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Most of America's Night Airports are G-E Lighted

BESIDES developing a complete system of airport illumination — floodlights, boundary lights, and beacons — to facilitate and safeguard night air-travel, General Electric has given to the aëronautic industry:

The G-E magneto compass, which has been found by some of America's best-known pilots to be the most accurate and reliable compass they have ever used.

The G-E supercharger, with which 70 per cent of the American engines built in 1929 were equipped, and which has made possible all American altitude records to date.

Also the G-E engine-temperature indicator, engine-speed indicator, oil immersion heater, card compass, arc-welding equipment, radio equipment, and other pioneer developments.

The G-E monogram, on products used in the air, on land, and at sea, is everywhere the mark of quality and reliability.

FOR THE HOME: Millions of American homes are made happier and more comfortable by electric appliances bearing the G-E monogram. These include refrigerators, radio sets, fans, vacuum cleaners; motors for many other electrically driven household devices; MAZDA lamps, wiring systems, and Sunlamps; Hotpoint electric ranges and appliances.

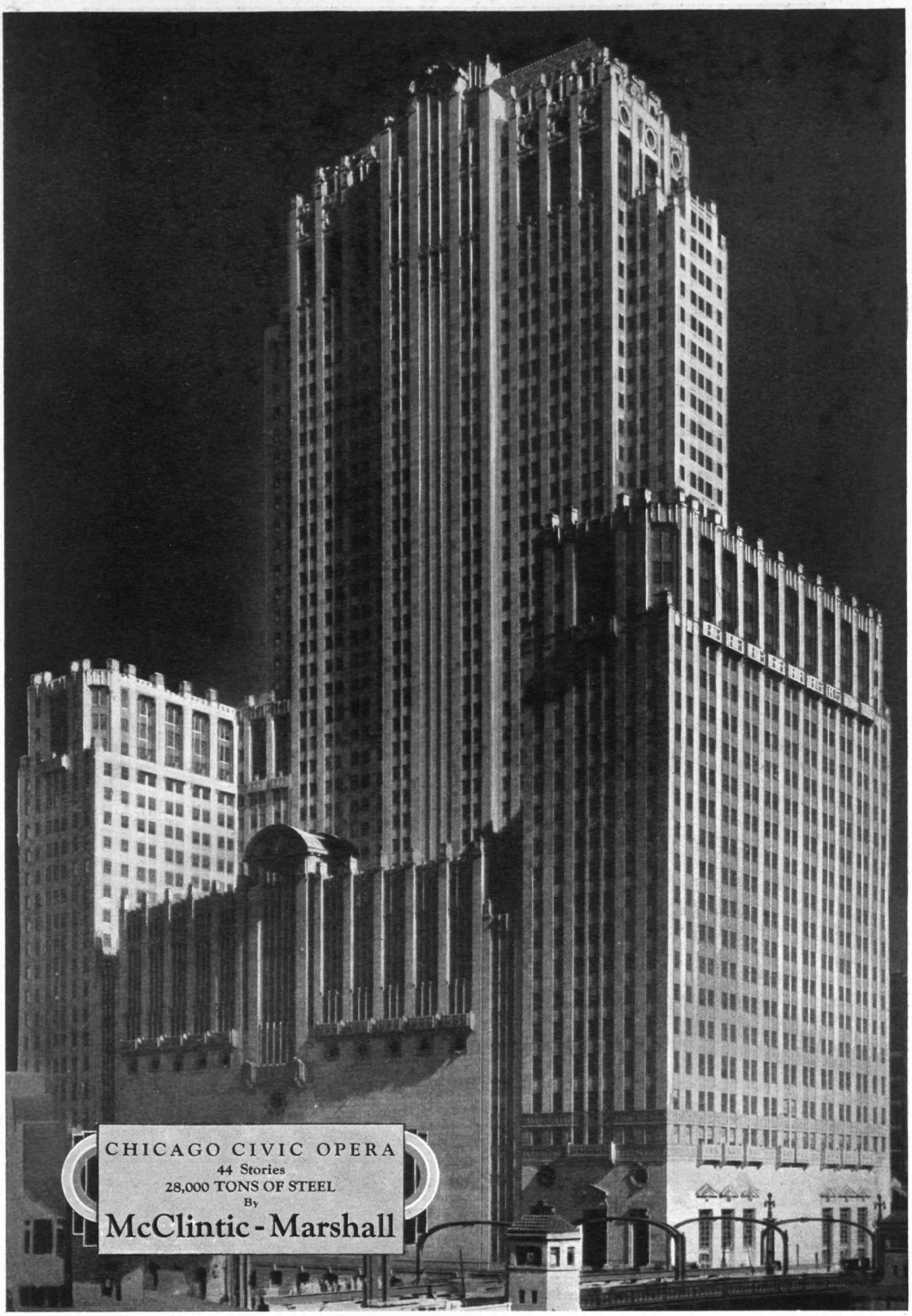
FOR INDUSTRY: G-E research and engineering have made important contributions to every basic industry, including apparatus for generating, transmitting, and applying electricity; electric furnaces and heating devices; street, traffic, airport, and Cooper Hewitt lights; Victor X-ray apparatus; equipment for railroad and marine electrification, and for street railways.

* * *

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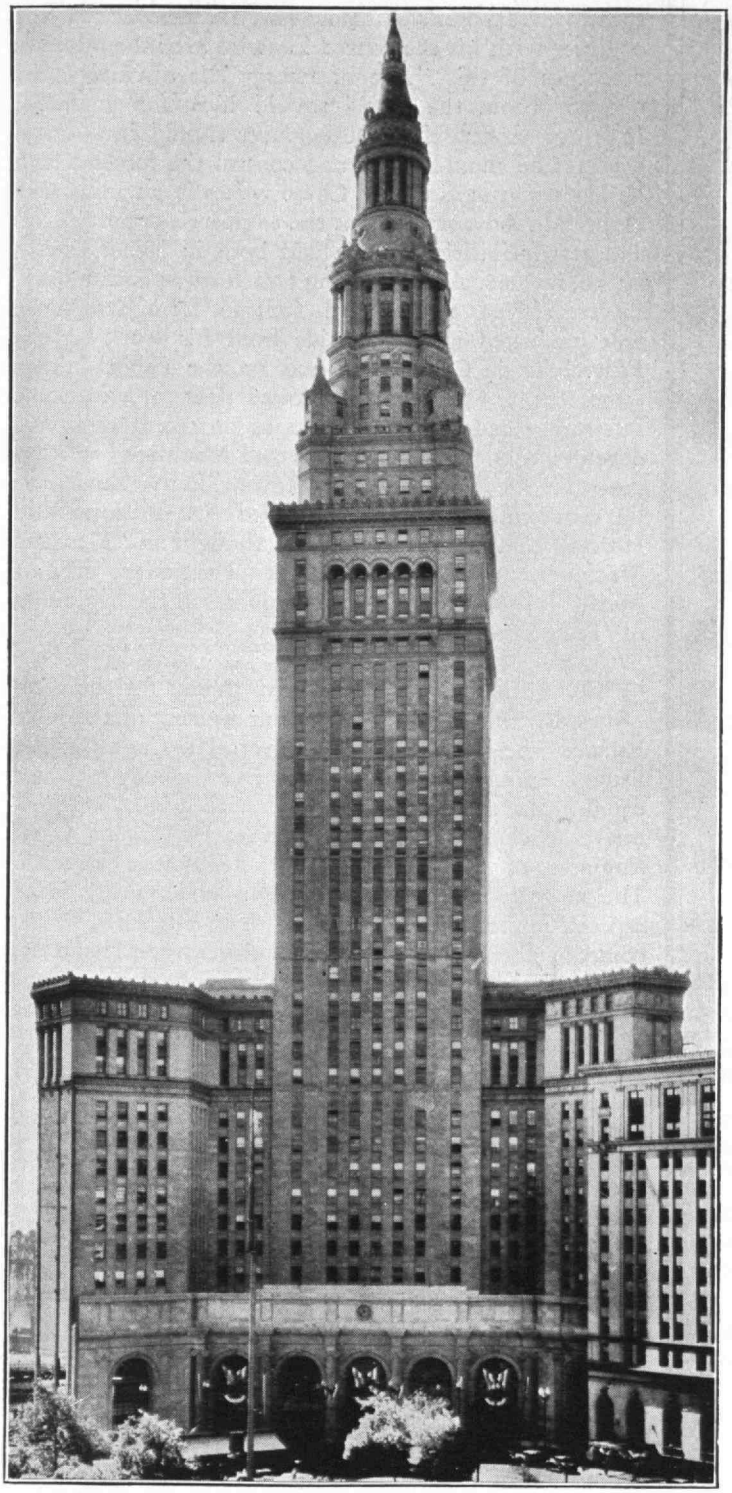
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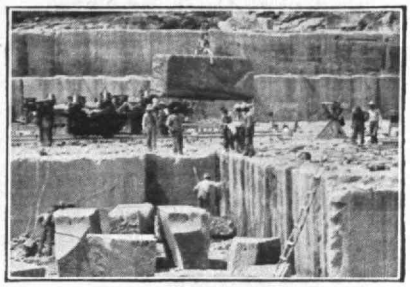
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LOS ANGELES · MONTREAL · BUENOS AIRES · RIO DE JANEIRO

MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED

Indiana Limestone in Cleveland's Newest Tower



Terminal Tower Group, Cleveland, Ohio. Graham, Anderson, Probst & White, Architects. John Gill & Sons, Builders. Built of Gray Indiana Limestone.



Quarry view, Indiana Limestone Company, Bedford, Indiana.

TOWERS of fine-grained, light-colored Indiana Limestone are now conspicuous on the skyline of every larger city. A noteworthy example is Cleveland's Terminal Tower. Modern business has approved the use of natural stone for today's office building. The reason is the proven value of stone as an income producer.

Where land values are high, every precaution is taken to assure a building's drawing power. Surveys in metropolitan areas show that Indiana Limestone buildings have a better than average renting record. The percentage of occupied space in Indiana modern stone structures is unusually high.

This indication of public approval means much, whether your building is a many-storied tower or an apartment or store building. Indiana Limestone is so moderate in cost that it is being used quite as extensively in small buildings as in the larger structures.

Before you commit yourself to building of any other material, no matter what type of construction you are undertaking, get a figure on its cost in Indiana Limestone. Our branch offices, located in principal cities, make this information quick and easy to obtain. We will gladly estimate without the slightest obligation. Put us in touch with your architect.

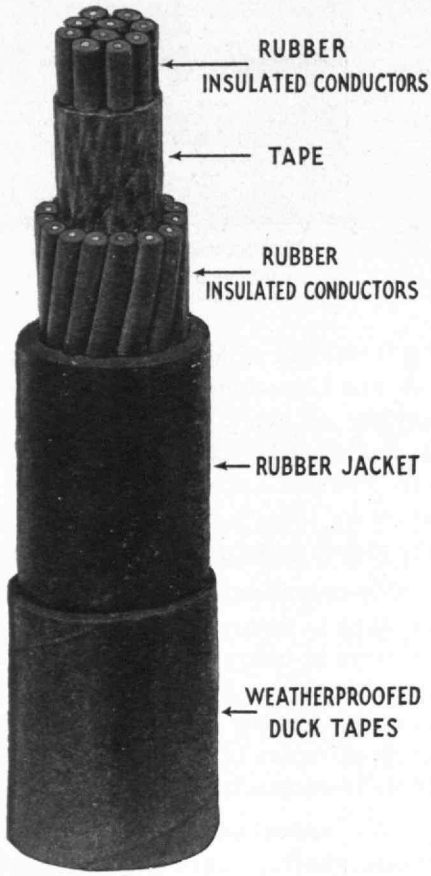
An illustrated booklet showing modern Indiana Limestone buildings will be mailed free. Please address your inquiry to Dept. 2126C, Service Bureau, Bedford, Indiana.

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Executive Offices: Tribune Tower, Chicago

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NON-METALLIC UNDERGROUND CABLE



TYPE R J

Simplex Non-Metallic Underground Cables provide a thoroughly dependable means of underground distribution at reasonable cost.

These cables are made in two types, Type W P protected by a series of weatherproofed tapes, and Type R J protected by a rubber jacket and weatherproofed tapes.

They are recommended for municipal street lighting, "white way," traffic signal installations, park, playground, or airport lighting and low voltage power distribution.

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PHILADELPHIA, 1227 Fidelity-Philadelphia Trust Building
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THE TABULAR VIEW

IN HIS article, "Prometheus Enchained," as in many of his books, Stuart Chase is interested in the ultimate destiny of machine civilization, with a sympathetic turn to the laborer's point of view. He believes that the engineer with his specialized knowledge of the intricate workings of this "Age of Energy" is obviously the one to whom the world should look for guidance. It is not enough that the engineer should invent and execute; he should direct and control the forces which he has set in motion. Mr. Chase writes in an admirably clear and robust style about the engineer's opportunities and responsibilities. ¶ He was born in Somersworth, N. H., in 1888. After spending two years at Technology, he transferred to Harvard College from which he was graduated in 1910. Aside from his work on the Federal Trade Commission and on the Labor Bureau (since 1914), Mr. Chase has found time to write some interesting and informative books on recent economic developments. His book "Men and Machines" was reviewed in the November, 1929, Review. In that same issue he contributed an article entitled "A Billion Wild Horses" continuing the trend of thought in "Men and Machines," and his recent book "Prosperity, Fact or Myth" is the one from which he quotes at the beginning of "Prometheus Enchained."

TEN million people should give thanks for the completion this year of the reservoir segment of a mighty balance wheel of the Hudson River. The Conklingville Dam, creating the Sacandaga Reservoir, a body of water equal in size to Lake George, is described in an authoritative article on page 70 by Edward H. Sargent, Chief Engineer of the Hudson River Regulating District. The magnitude and success of this undertaking is of especial interest to engineers and those interested in the control and efficient use of the country's water resources. Mr. Sargent has played a major part in the development of this project and there is likelihood that the authorities of New York State may name the new reservoir Lake Sargent. ¶ Mr. Sargent is a native of Newburyport, Mass., and was graduated from the Institute in 1907. Previous to his work on the Sacandaga Reservoir, he spent some ten years as assistant engineer in charge of water power investigations in New York State, including the design and construction of Crescent and Vischers Ferry hydro-electric plants on the Mohawk River. In addition to his activities as Chief Engineer of the Hudson River Regulating District, he has been chairman of the Power Division of the American Society of Civil Engineers since 1927.

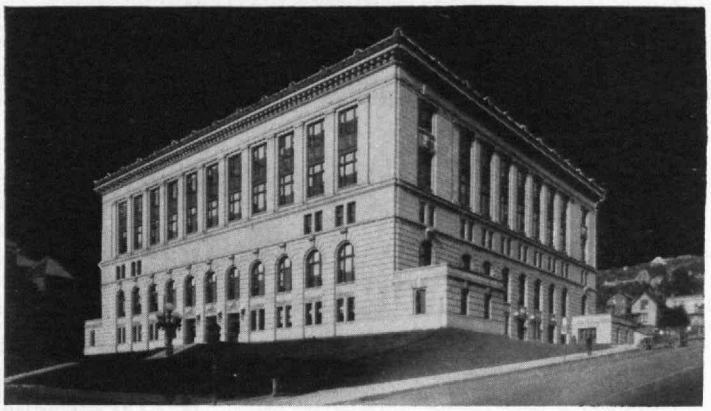
AS AN expert in instalment finance, Otto C. Lorenz, '18, has been called on recently to handle some important tasks in America and abroad. Mr. Lorenz made a special survey to establish an instalment finance plan for a subsidiary of the Studebaker corporation in Venezuela and other South American countries in 1928. The following year he did organization work in Switzerland in connection with the International Credit and Securi-

(Concluded on page 62)

JOHNSON HEAT AND HUMIDITY CONTROL

CITY HALL . . Duluth, Minn.

Thomas J. Shefchik, *Architect* . . Duluth, Minn.
Charles Foster, *Engineer* Duluth, Minn.
Carlson Brothers, *Contractors* . . Duluth, Minn.



VACUUM steam heating, with five ventilating units serving various separate departments are in this building. Johnson Dual Control with 120 thermostats and complete control on all ventilating units is installed.

Under this arrangement the departments that are used only during office hours are heated to seventy degrees during such periods of occupancy and are set back to fifty degrees during the time which they are not in use. The police department and signal departments are used twenty-four hours a day and are carried at normal temperatures at all times. In this particular case the steam is purchased and considerable saving results from the use of dual control apparatus.

The ventilating units for the court rooms, council rooms, jury rooms and general office are arranged in accordance with the best ventilation engineering practices, so that air will be supplied at a constant temperature and humidity.

A unique feature of this installation is the heating of the main entrance vestibules by fan units and an arrangement of control by which these vestibules are maintained at a constant temperature, and there is never a draft of cold air due to opening of outside doors, which is a prevalent condition in the ordinary building in Duluth where very severe climatic conditions occur.

Nearly Every Day Some New "Service" Feature Is Added To Johnson Control

Forty-five years ago The Johnson System Of Heat & Humidity Control was placed on the market.

It was the first successful method of complete temperature regulation.

Every notable advance in heat and humidity control apparatus since has had its origin with this company.

Although satisfactorily serving its users, this company is never fully satisfied with the product.

Search for the better is constantly conducted.

Nearly every day new service features are added; minor some of the times but yet advisable.

Every Johnson installation is inspected annually, without charge.

And with 30 branches located geographically convenient to every city in United States and Canada, Johnson emergency attention is given within 24 hours anywhere.

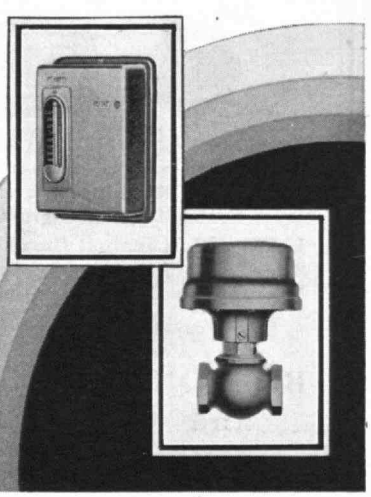
That is the reliability behind Johnson Heat & Humidity Control.

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149 E. Michigan St. MILWAUKEE, WIS.
Established 1885

The All-Metal System.

The All Perfect Graduated Control of Valves & Dampers.

The Dual Thermostat (Night & Day) Control: Fuel Saving 25 to 40 Per Cent.



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Designers and Builders
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TOOLS, GAGES, AND SPECIAL MACHINERY OF ALL KINDS

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Address all inquiries to
J. G. Russell, '13 *or* **H. Russell, '16**



High Tension Wires for Oil Burner Ignition

with flameproofed interlayer braid in the wall of rubber insulation



U. S. Patent No. 1458803

For domestic oil burners utilizing the safety and economy of electric spark ignition. B. I. W. Interlayer Braid oil burner ignition wire provides:

1. **Protection against the absorption of oil**
2. **Two flameproof braids, one within the insulation**
3. **Ample insulation to withstand the high voltage**

For 25 years manufacturers of high grade rubber covered wires and cables

BOSTON INSULATED WIRE and CABLE COMPANY
Boston, Mass.

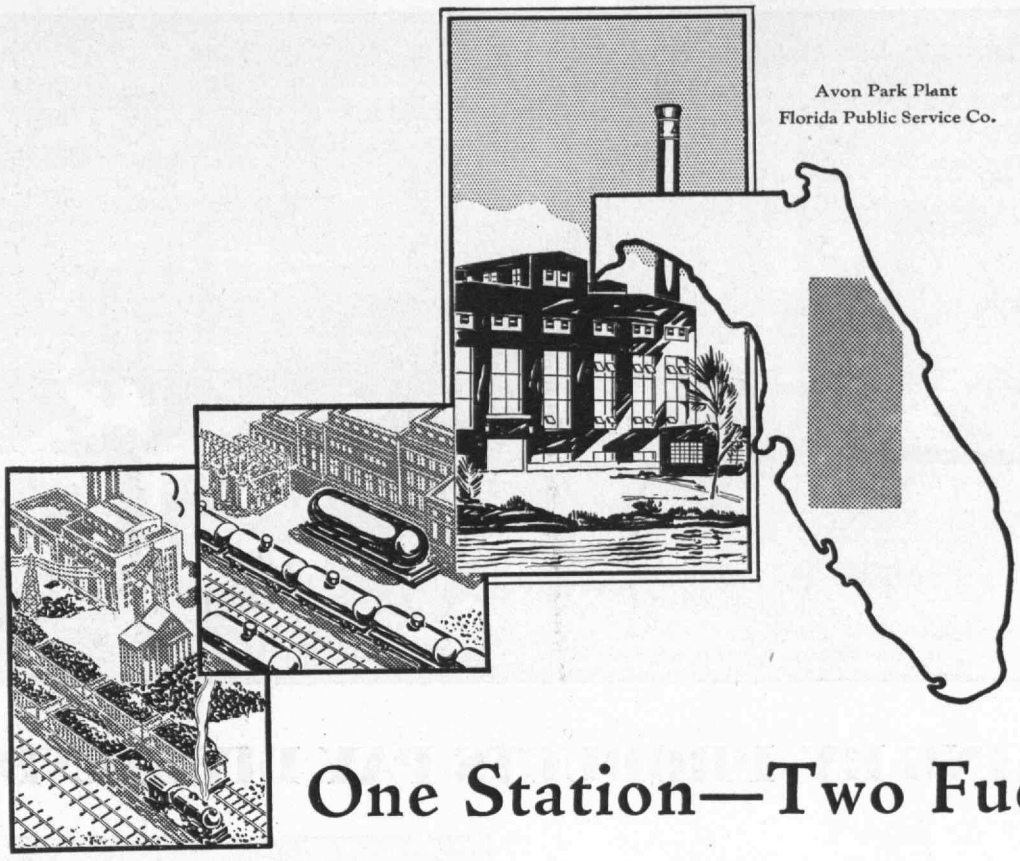
THE TABULAR VIEW

(Continued from page 60)

ties Corporation, established for the purpose of purchasing instalment paper arising from the sale of American goods. This work has required special studies of the mathematics of instalment selling and of the statistical, the accounting, and the budgeting procedures involved. ¶ The Review is the first magazine to publish the Equation of Stability, evolved by Mr. Mott-Smith who is associated with Mr. Lorenz. This equation, a single application of which is given, is unusually significant in the world of finance, and the other material included in this article presents the newest and most advanced methods for attacking the problems of instalment finance.

RUSSIA is the great enigma of modern times, and intimate, first-hand information about it is invaluable to an intelligent appraisal of the astounding experiments now being made there. The engineer is playing an essential part in the changing order and is therefore able to learn much more about actual conditions. ¶ As mentioned in the October Review, the article "Industry and Engineering in the Union of Socialist Soviet Republics" represents the experience and impressions of an American engineer on his second professional visit to Russia and originally was not written for publication. For this reason the writer prefers to be known as An American Engineer.

WASHINGTON has fittingly become one of the world's loveliest capitals, but people admiring it as such are generally unpercipient of the elements that make up its beauty, and ignorant of the arduous and complicated planning and engineering upon which that beauty so gracefully rests. In the past many people, too, thought more about the beauty of Washington than about its livability, with the result that recent years have necessitated great changes in its organic structure. All of these things George A. Ricker reviews in "The Washington Nobody Knows." As a resident of Washington for 12 years, and as a sometime member of the Coördinating Committee of the National Capital Park and Planning Commission of the District of Columbia, he writes out of first-hand knowledge. ¶ Mr. Ricker received his elementary education aboard ship with his father, an old-time merchant sea captain. After his graduation from the Institute in 1886, Mr. Ricker's professional career led him into interesting channels. He built the Niagara Gorge Railroad, Buffalo Traction Company's lines, and served as engineer of the Buffalo Creek. As First Deputy Commissioner of highways in New York, he was active in the reorganization of the engineering corps, and rewrote the state highway specifications. He also designed the first steel and concrete railway track. Aside from his special interest in Civil Service Reform, he writes articles on engineering for technical journals and societies.



Avon Park Plant
Florida Public Service Co.

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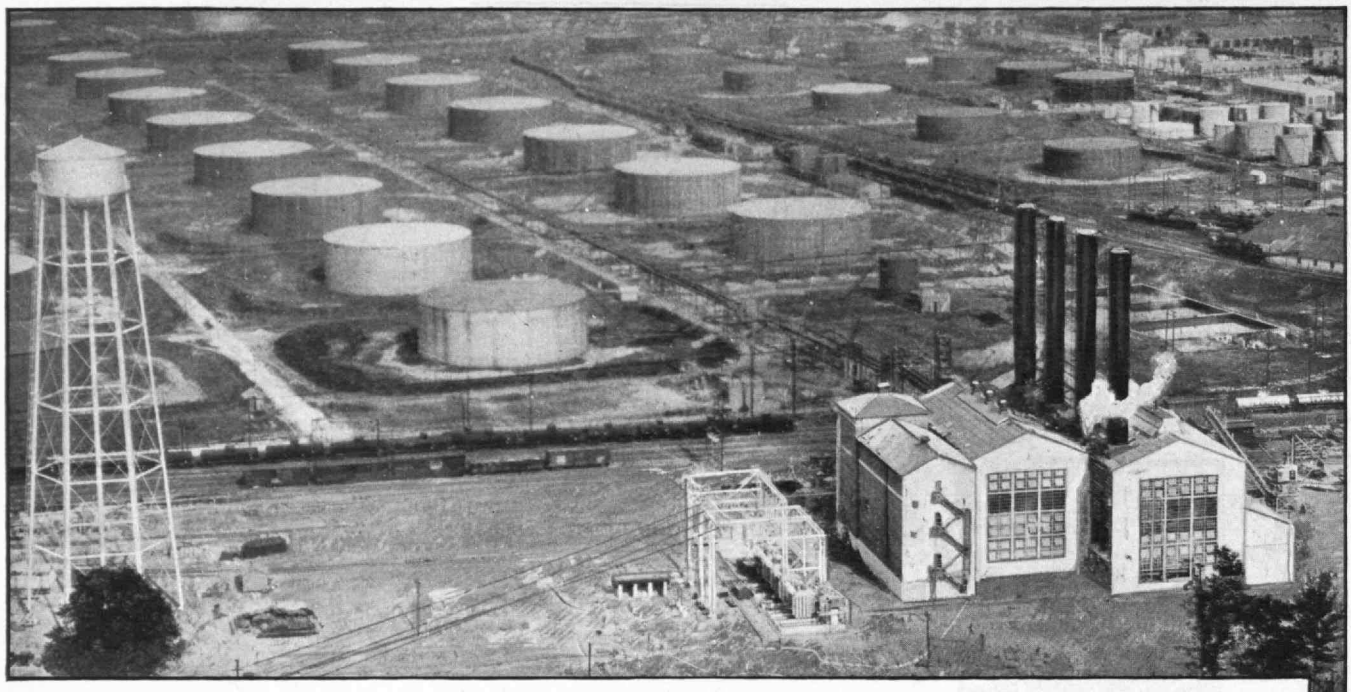
The Barstow staff is qualified to handle every detail of the job.

Our twenty-page construction booklet will be forwarded on request.

W. S. BARSTOW & COMPANY, INC.

Engineering—Design—Construction

120 Wall Street, New York, N. Y. 412 Washington Street, Reading, Pa.



MAKING BY-PRODUCTS PAY DIVIDENDS



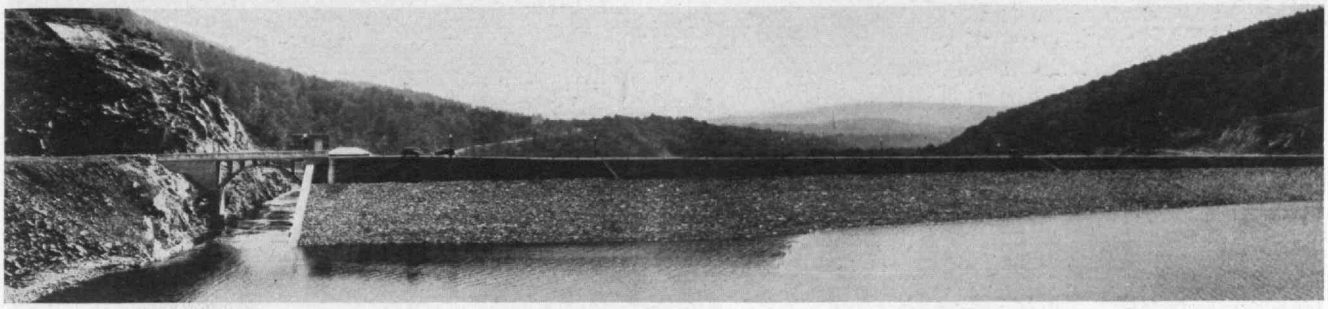
Six billion pounds of steam a year are supplied to the Standard Oil Company of Louisiana by the steam power plant of Louisiana Steam Products, Inc. Electric power is supplied by the same plant to the Baton Rouge Electric Company. Both companies are served at lower cost. This saving is accomplished by burning all available residuals of the Standard Oil Company's refinery.

The plant, designed and built by Stone & Webster Engineering Corporation, was operating in 5 months and 12 days from the time ground was broken.

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For the
BUSINESS LEADERS
OF AMERICA

STONE & WEBSTER ENGINEERING CORPORATION

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SACANDAGA RESERVOIR. SEE PAGE 70

THE TECHNOLOGY REVIEW

Edited at the Massachusetts Institute of Technology

VOLUME XXXIII , , , NUMBER 2

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CONTRIBUTING EDITOR
JOHN J. ROWLANDS

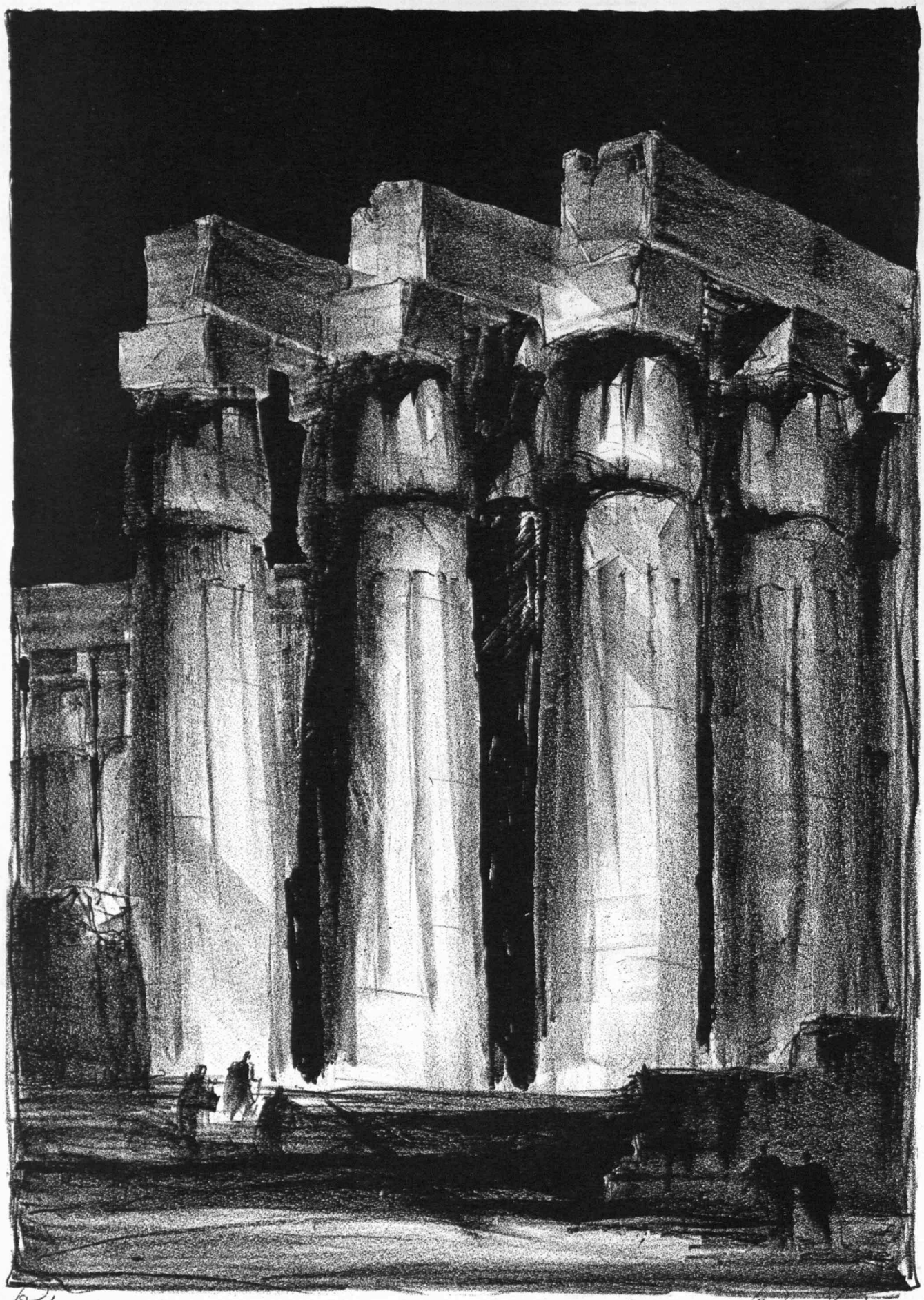
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PROMETHEUS ENCHAINED

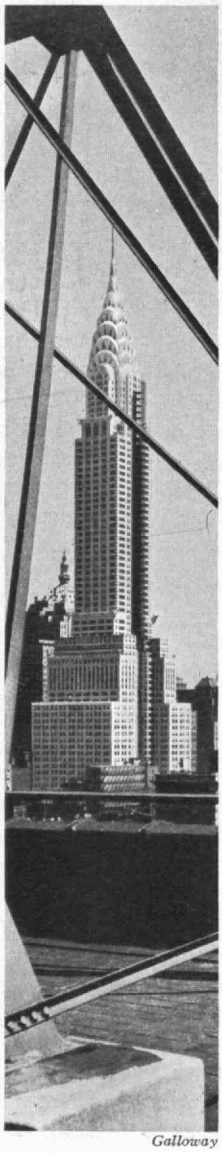
Today the Greatest Need in All the Bewildered World Is for Philosopher Engineers

BY STUART CHASE

I ONCE wrote a book and ended it with these lines: "Prosperity in any deeper sense awaits the liberation of the engineer. If the owners will not get off his back I, for one, would not be sorry to see him combine with the wayfaring man to lift them off. A complicated technical structure should be run by engineers, not hucksters. But the technician is the modern Prometheus in chains."

I have been asked to be more explicit. It is good to end a book with a round, ringing climax, but not quite so good to be forced to explain all its implications. I recognize, however, my responsibility in the premises. I said flatly enough that I preferred engineers to business men as directors of our economic destinies, and it is clearly my duty to state the reasons.

Since James Watt tinkered with Newcomen's engine, the technician has been increasingly interfering with our food supply, and indeed with the whole economic structure. He has completely undermined the self-supporting village and the economically independent local community, over all of Western civilization, and is in the process of devitalizating it throughout the rest of the world. A few months ago in Mexico I saw the fresh cuts and fills of motor roads scarring the mountain sides, and cement foundations laid for high-power transmission lines. I knew that the end of the balanced Aztec economy was near. There has been a great deal of loose talk about "progress," "prosperity," "the torch of science"; but the complete uprooting of the age-old contact between the wayfaring man and his environment is a pretty serious business; far more serious indeed than the Prosperity Chorus has ever stopped to realize in its mad dash toward the goal of the bigger and better.

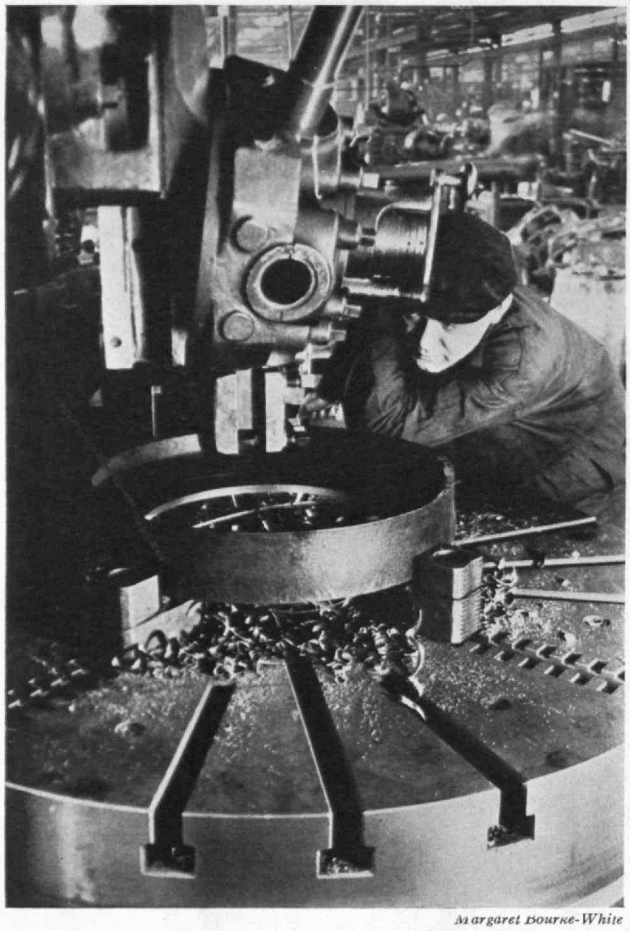


Galloway

"THE HIGHEST BUILDING"

What has happened in essence is this: before Watt, the majority of men and women everywhere were capable of providing their own food, shelter, clothing and entertainment in whatever locality they found themselves. They were steeped in the tradition of wresting their own necessities from the soil, the waters, the forests about them. They may have done it with deplorable inefficiency, but they did it. Shipwreck a group of them on an uninhabited but fertile island, and they knew how to carry on.

Year by year since 1765, the mass of mankind has been losing the ability to carry on. Shipwreck an assorted crew of bookkeepers, truck drivers, machinists and advertising men on an uninhabited but fertile island, and I would not give them two months' survival. The advertising section would hold some splendid conferences and inscribe some spirited programs, but nobody would know how to do anything. Unless by some happy chance one of the bookkeepers was a truck gardener on the side. Today the millions live in total and sublime ignorance of the forces which feed, shelter and clothe them. For all they know, switches produce light, and chain stores food. The functioning of the ecomonic process rests in the heads of a few thousand highly trained experts; in *your* heads, if you please. Is it too much to say that if a hundred key technicians left their posts they could seriously cripple, if not positively terminate, the functioning of a great city like New York? To make matters even more potentially precarious, each expert is so highly specialized that he has little if any conception of the work of the others. There is no General Staff, understanding the whole process, and correlating the vital nerves of transportation, communication, power, water, food supply,



Margaret Bourke-White

"... SPECIALIZATION MAKES FOR ECONOMIES ... BUT IT ALSO MAKES FOR A HIGHLY COMPLICATED NERVOUS SYSTEM, A CERTAIN TECHNOLOGICAL TENUOUSNESS"

which furnish the economic substratum of the modern community.

Specialization makes for economies, sometimes prodigious economies, as the Progress Boys are tireless in pointing out. But it also makes for a highly complicated nervous system, a certain technological tenuousness, which carries a threat greater than anything we have known before. Indeed, a whole series of threats, including:

Technological unemployment
Mechanized warfare — particularly the three-dimensional attack of the bombing airplane
Social standardization
Over-rapid exhaustion of natural resources
The creation of a factory robot class
Second-hand rather than participating recreation forms
The compulsion of speed, with consequent deleterious effects on the human nervous system

I am enough of a Progress Boy myself to admit, somewhat grudgingly to be sure, that I am glad James Watt did some tinkering. (If he had not, another bright young instrument maker would have invented a practicable steam engine, and that within a decade. The times demanded it, and it would have come.) By and large, we stand to gain more than we stand to lose by the emergence of the technical arts and the economic specialization which they have created. But this should not blind us to the chances taken and the risks involved. Some four million unemployed last winter must have frequently wished to be back in the handicraft age when unemployment was virtually unknown. (Provided that they knew any economic history — a dubious enough assumption.) All is far from the best in a moderately uncertain world — with just a chance that another first class war, or another decade of uncorrelated specialization, might wipe out the whole credit side of the ledger, and make us all wish to be back in a self-sufficient local economy.

In brief, you engineers have been raising considerable hell, along with your not altogether heavenly technical improvements in economic life. And the point I wish to stress is this: you have been doing the horse work while letting somebody else — chiefly the business man — take the responsibility. It seems to me that the responsibility should be squarely yours. By the same token, the credit — if credit there be — should be yours. You have played the shrinking violet long enough. You have remade Western civilization, and created at the same time certain malignant evils — actual, like technological unemployment; potential, like a smash-up due to over-specialization. You should shoulder the burden of mitigating these evils; which means directing the destinies of the new society that you have built. You are responsible for it; you are the only group in the community capable of understanding its highly complicated structure. Statesmen, philosophers, generals, poets, may lead self-supporting communities, but only engineers may lead a great, interlocked economic structure — with a score of exposed live arteries throbbing in every metropolitan area.

IN a sense the modern world is not led at all. It simply flounders. In the United States, for instance, we have a political government composed chiefly of office-seekers and chair warmers who have no more idea of the complexities they are supposed to direct than the man in the moon. Mr. Hoover may have some notion of them, but the aforementioned office-seekers have him both blockaded and frightened. The real action in the Republic is provided by business men affiliated with large corporate enterprises. A few of them, like Mr. Owen D. Young and Mr. Dwight Morrow, may possess some sense of state, to use the phrase of H. G. Wells, but the majority neither know nor care where the ship of state is headed.

The pursuit of profit is a stimulating adventure but an intensely narrow one. Rare is the business man who can look over the top of his own balance sheet; rare even the man who can plan for a balance sheet three years in advance. So far as the Republic moves, however, the man of business provides the driving force, leaving the statesman, the philosopher, the professor, the editor, the general, the parson, gloomily to contemplate the crowns which once they wore.

At the heel of the business man follows the engineer. The former says: Let there be light, and the latter provides it . . . Let there be a thousand oil wells (in a pool where wasteless exploitation requires but a hundred) and they are obediently drilled . . . Let there be the highest building in the world (to choke an already throttled Grand Central station) and it is built . . . Let there be an almost ultra-violet lamp (to sell to the millions who believe in advertising) and, brave in nickel and aluminum, it is properly constructed. . . .

YOU get the point. The engineer has built the modern world, but only at the bidding of his master's voice. The master knows not a crank shaft from a piston rod, but he knows what will sell; and is quick to see the profitable possibilities of every advance in pure science. The world is not planned by the business man, for he has no plan. It is not planned by the engineer, for hitherto that has never been his function. He has constructed endless detail — as directed — but the whole, whether it be the nation, an economic region, a city, a railway system, a coal basin, a single industry, a straight line marketing system, has never been relegated to his charge. As described in The Technology Review of last May, technicians are building in suburban New York a little town, ultimately to house 25,000 people, designed specifically for the motor age. So far as I know, this is the biggest single project involving a social-economic goal ever permitted to the engineering mind. (The Panama Canal was another, but that lies outside the country. In Russia today, the engineering mind has the disposal of some thirty-three billions of dollars for new construction during the next five years (*See page 76*). It will probably be the most convenient, comfortable, the safest, and perhaps the most sightly suburban town to live in that the nation has ever known. The business man has stepped aside — taking a modest six per cent — to let the engineer run the show.

It is my conviction that the engineer can run far bigger shows than the town of Radburn to the satisfaction of (1) the people who are to use them or work in them, (2) the investor, (3) himself, and (4) the technical requirements of the country's future development. Suppose, for instance, that broad-visioned engineers had had the past century in charge as directors — or co-directors if you will. Would they have permitted:

The depletion of our forests at a rate four times that of the annual growth?

The violation of all the laws of geology in the exploitation of petroleum pools?

The present criss-cross and duplication in the transportation system?

The neglect of cheaper waterways for the profitable exploitation of high cost railways?

The exhaustion and erosion of soils and the floods which follow after?

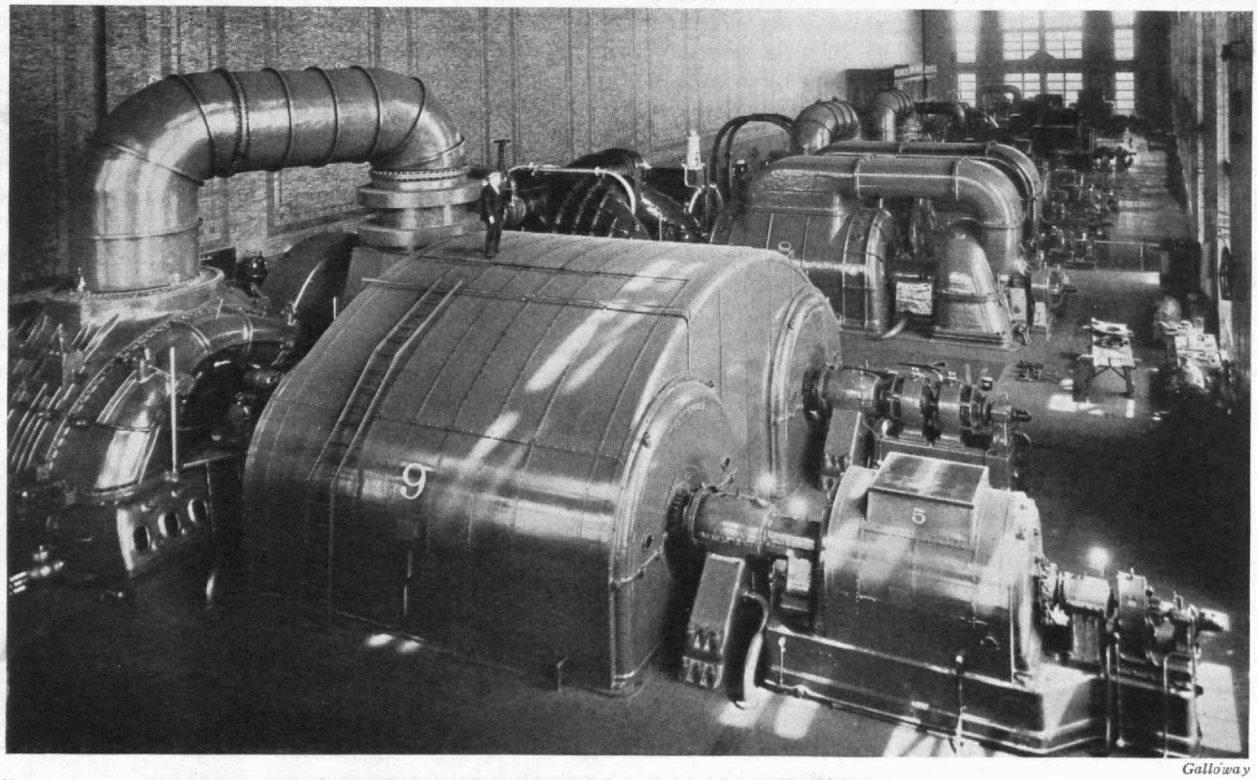
The jams, bottle necks and traffic tangles of metropolitan districts?

The building of skyscrapers faster than the means to empty and fill them?

The elephantiasis of New York City at the expense of other ports and other logical industrial and commercial centers?

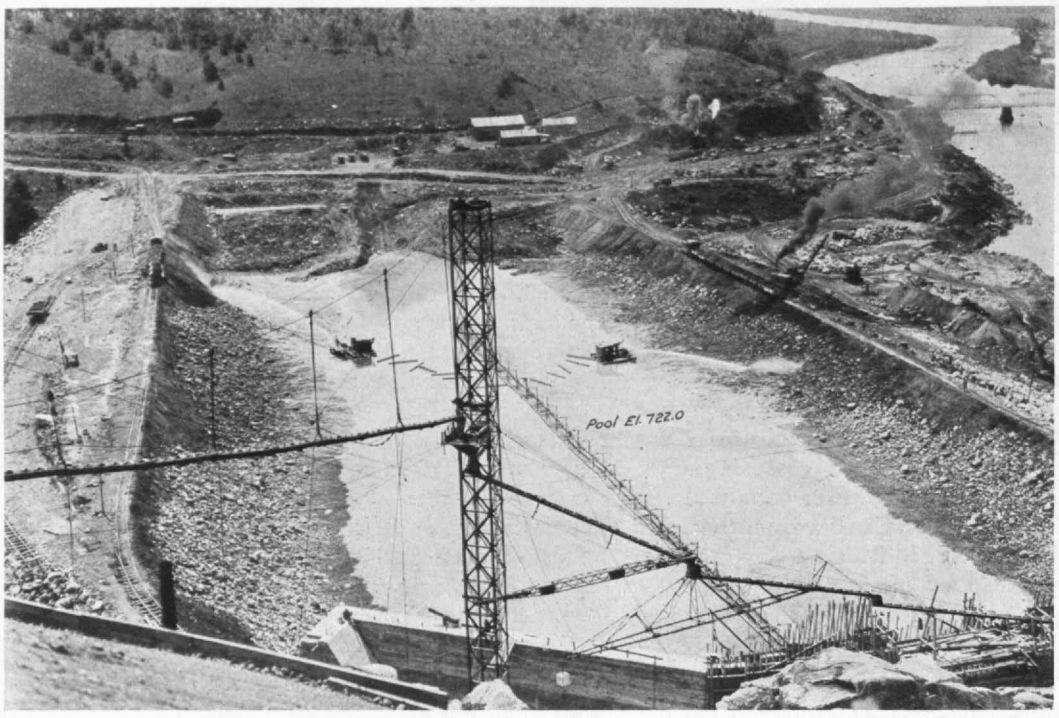
The cross-hauling of raw metals to Connecticut and finished brass back to the West again? Or, if you please, the desecration (to say nothing of the added accident rate) of every highway in the country with millions of square feet of cigarette, cosmetic, and soap appeals?

That a century of the engineering mind controlling, or helping to control, economic forces, would have made a wasteless world is, of course, highly problematical. The rate of obsolescence in the technical arts is so great that nothing can be planned with any finality. Mistakes would have been made; loss and leakage taken their toll. But I am inclined to believe that a good half of the manpower which now runs to waste might have been salvaged, with the result that poverty would have been quite finally abolished, unemployment (*Concluded on page 96*)



Galloway

"... IT IS A MIND THAT ... HAS THE COURAGE TO ACCEPT THE JOB OF TAMING THE BILLION WILD HORSES WHICH WATT LET LOOSE"



SLUICING THE ROCK FLOUR CORE OF THE CONKLINGVILLE DAM

HARNESSING

How a Recalcitrant River Is Being

By Edward

THE great floods in the Mississippi Valley and in New England during the past few years have brought vividly to public attention the need for minimizing these catastrophes. One of the most complete systems for controlling the flow of a river and thus guarding against floods is to be found in the state of New York where a system of reservoirs is being constructed to regulate the flow of the Hudson and Sacandaga Rivers. The largest unit in this system, the Sacandaga Reservoir, has been completed, and its success already demonstrated.

If the highest collected and permanent body of water be accepted as the head of a watershed, then the source of the Hudson River is Lake Tear-of-the-Clouds, which lies at an elevation of 4,322 feet above sea level. Feldspar Brook, the outlet of Lake Tear, flows into Opalescent River, thence to the Hudson River, and 300 miles to the Atlantic Ocean. It is interesting to note that practically all of the fall of the river occurs in the first 150 miles of its length, the last 150 miles from Albany to the ocean being tidewater. The watershed at Lake Tear is less than one square mile and at the confluence of the Hudson and Sacandaga Rivers about 2,700 square miles. The watershed is 8,100 square miles below the confluence of the Mohawk and 13,400 square miles at its mouth.

The annual precipitation varies considerably on the watershed, 38 inches at Albany, approximately 45 inches at Glens Falls and exceeding 60 inches in the higher reaches of the watershed. Thus nature has been lavish in giving a bountiful supply of water but, unfortunately, the distribution of flow has not been steady. A large part of the precipitation comes in the form of snow and remains on the watershed until spring thaws and rains cause a rapid runoff. The greatest flood in the known history of the Hudson River occurred on March 28, 1913, the river reaching a peak at Albany of 225,000 cubic feet per second, whereas in September of the same year the river dropped to less than 1,000 c.f.s.

Similar ratios between maxima and minima flows occur at points upstream on the river. The flood of 1913 reached at Albany an elevation of 22.4 feet above mean sea level,



BATCHELLERVILLE BRIDGE ACROSS SACANDAGA RESERVOIR



COMPLETED CONKLINGVILLE DAM IMPOUNDING THE SACANDAGA RESERVOIR

THE HUDSON

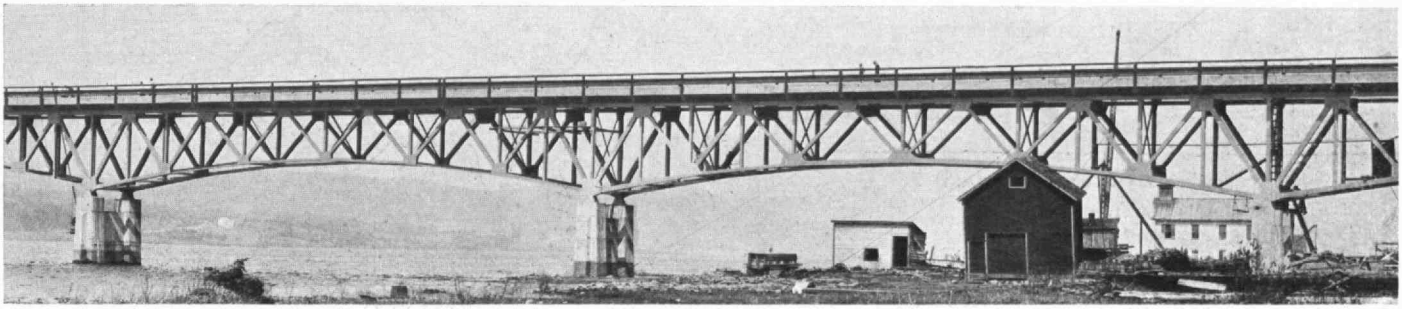
Tamed and Made a Greater Public Servant

H. SARGENT

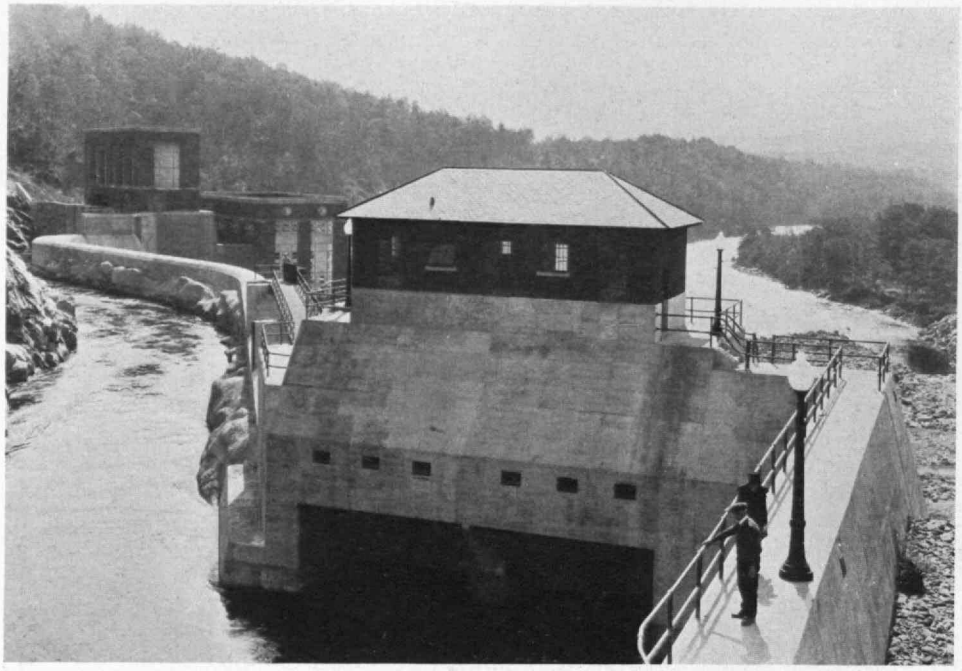
over 20 feet higher than the low water stage. This flood did over $1,000,000 worth of physical damage in the vicinity of Albany, Troy, and Rensselaer, and the indirect damage was probably more. For example, the filtration plant which purifies the water supply of Albany was inundated and although the health authorities advised the boiling of water, many families failed to do so and a serious typhoid epidemic occurred. It is well known that following such an inundation many diseases occur due to the unsanitary conditions in the houses along the river banks, especially the detritus carried by the flood and the cold, damp after conditions. Although the 1913 flood was the most disastrous, other floods are frequent.

The damage from low flow in the river is perhaps as serious economically as the damage from floods, although less spectacular. There is, for example, an installation of water power plants along the Hudson River of 260,000 horse-power, yet in times of low flow only 35,000 horse-power can be generated. This means that public utilities must supply the deficiency of power from other sources, probably steam, and that paper and pulp mills must partially shut down their plants with serious loss to owners and employees. By the operation of the Sacandaga Reservoir, the minimum flow will be more than tripled, increasing the continuous power at existing plants to over 120,000 horse-power, and unsanitary conditions due to the excess pollution of the sewage and trade wastes will be greatly lessened by the improved regimen of flow.

This year's drought has afforded an exceptionally good opportunity to observe its beneficial effects. During the month of September, the flow of the Hudson River was approximately tripled by storage water released from the Sacandaga Reservoir, the average flow of the river at Glens Falls, N. Y., being 2,920 second feet, of which 1,870 second feet were released from this reservoir. The vastness of such a reservoir is brought out by the fact that during September it was only depleted 3.8 feet, which meant that 3.9 billion cubic feet of water were released during that period. This regulation was obtained despite the fact that the reservoir was filled last spring



THIS BRIDGE CONTAINS 19 SPANS, EACH 150 FEET LONG, AND TWO SPANS, EACH 75 FEET LONG



CONTROL-HOUSE, SPILLWAY CHANNEL, AND POWER-HOUSE AT THE CONKLINGVILLE DAM

only to an elevation of 760 feet, whereas in the future it will be filled to the crest of the spillway, an elevation of 771 feet. This latter elevation will give an available storage of 30 billion cubic feet, whereas this year the available storage is only 18 billion cubic feet.

Had this storage capacity been available during the flood of 1913, the peak flow at Glens Falls, 84,000 cubic feet per second, could have been reduced to 50,000 cubic feet a second, and the maximum flood water elevation at Albany could have been kept down nearly three feet. These facts demonstrate clearly the size and importance of the Sacandaga Reservoir and the efficacy of a reservoir storage system to prevent floods and even the flow of a great river.

What is the story behind the building of the Sacandaga Reservoir and the creation of the Hudson River Regulating District? In 1867 Mr. Samuel McElroy submitted a report to the New York State Legislature which contained the following suggestions:

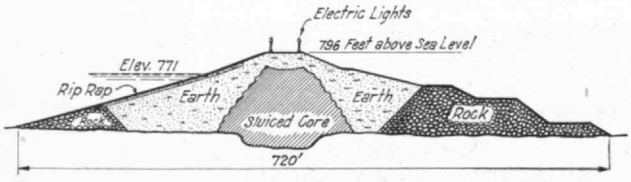
"In connection with this general subject, I have to suggest to your attention, the probable means of alleviating a very serious and increasing contingency. . . .

"It is well known to any resident of the Hudson above New Baltimore that the river is subject to very sudden and powerful spring freshets, which are aggravated by the ice movements. These freshets always cause great loss of property and its equivalents, in time and otherwise, and sometimes seriously jeopardize life. It would be difficult to estimate, in money, the annual cost they occasion, sometimes exceeding $250,000 at Albany and vicinity, and, by laws well known to hydraulic engineers, gradual cultivation and clearing of the country gives the rainfall a speedier delivery, and tends, in one direction, to increase flood discharge, while in another it reduces, through increased evaporation, the aggregate drainage delivery and summer flow.

"If, then, the conformation of the river banks in Warren and Essex counties is such as to facilitate the construction of dams of short lengths to form reservoirs of great capacity, a condition of which seems to be fully insured by the lake sources and succession of mountain gorges, it may be possible, with a moderate outlay, to modify and relieve these annual disasters."

Eugene L. Ashley of Glens Falls, who was a pioneer in water power development along the Hudson River and who as President of the Hudson River Water Power Company promoted and built the Spier Falls dam and power house, conceived the idea of a Sacandaga Reservoir, the storage from which would increase greatly the output of the Spier Falls plant. The reservoir was to be created by a dam at Conklingville, which is located in Saratoga County about six miles above the confluence of the Sacandaga and Hudson River, and this site was known for a number of years as Ashley Falls.

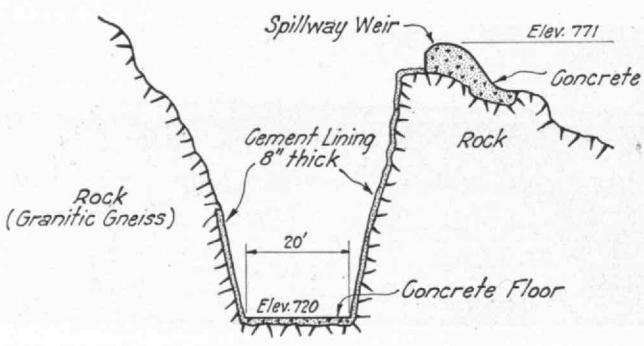
In accordance with Mr. Ashley's plans the Hudson River Water Power Company in 1900 began topographic and property surveys of the Sacandaga Reservoir basin, the surveys being made on the basis of a flow line at elevation 740 feet above sea level, it having been planned to raise the existing timber crib dam 24 feet. These surveys and also the borings for the dam foundation were of great value in the subsequent (*Continued on page 96*)



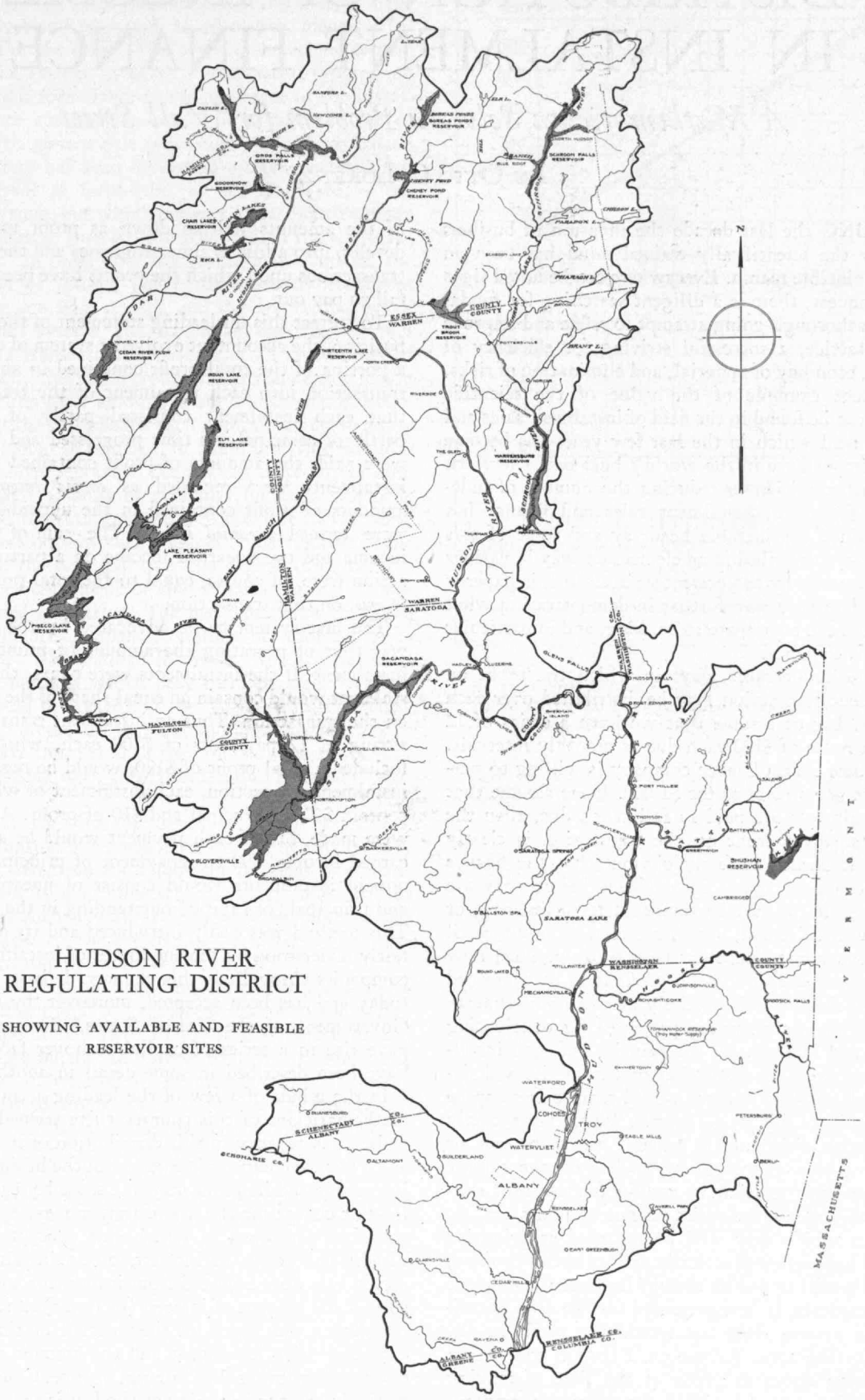
TYPICAL SECTION OF EARTH DAM

Maximum Height 96 Feet
Top Width 40 Feet
Upstream Slopes: 1 on 4, 1 on 3.5, 1 on 3
Downstream Slopes: 1 on 1.5, 1 on 2, 1 on 4.25, 1 on 2.5

CROSS SECTION SHOWING CONSTRUCTION OF DAM



TYPICAL SECTION OF SPILLWAY CHANNEL


HUDSON RIVER
REGULATING DISTRICT
SHOWING AVAILABLE AND FEASIBLE
RESERVOIR SITES
N
VERMONT
MASSACHUSETTS
ESSEX
WARREN
COUNTY
HAMILTON
FULTON
COUNTY
SARATOGA
COUNTY
WASHINGTON
RENSSELAER
COUNTY
SCHENECTADY
COUNTY
ALBANY
COUNTY
GREENE
COUNTY
COLUMBIA
COUNTY
SCHOHARIE
COUNTY
RENSSELAER CO.
COLUMBIA CO.
ALBANY CO.
GREENE CO.
SCHOHARIE CO.
SCHENECTADY CO.
SACANDAGA RIVER
HUDSON RIVER
MOHAWK RIVER
SARATOGA LAKE
TROY
ALBANY
WATERVLIET
COHOES
WATERFORD
GLOVERSVILLE
JOHNSTOWN
GLENS FALLS
HUDSON FALLS
FORT EDWARD
FORT MILLER
SCHUYLERVILLE
MECHANICVILLE
BALLSTON SPA
SARATOGA SPRINGS
PETERSBURG
EAGLE MILLS
BUILDERLAND
ALTAMONT
CLARKSVILLE
EAST GREENBUSH
CEDAR HILLS
RENSSELAER
CAMBRIDGE
GREENWICH
SALEM
ARGYLE
CREEK
BLACK
CEDAR
RIVER
INDIAN LAKE RESERVOIR
ELM LAKE RESERVOIR
LAKE PLEASANT RESERVOIR
PRECO LAKE RESERVOIR
CHAIR LAKES RESERVOIR
ONOS FALLS RESERVOIR
BOONDOCK RESERVOIR
BENSON MINES RESERVOIR
SCHROON FALLS RESERVOIR
CHEESBRO L.
PALMERTON L.
PHARAOH L.
BRANT L.
THURMAN L.
SACANDAGA L.
SACANDAGA RESERVOIR
THIRTEENTH LAKE RESERVOIR
TROUT BROOK RESERVOIR
WARRENSBURG RESERVOIR
SHUSHAN RESERVOIR
TOMHANNOCK RESERVOIR
(Troy Water Supply)
NORTH CREEK
THE GLEN
MECHANICVILLE
JOHNSONVILLE
WOODSIDE
ROUND LAKE
STILLWATER
SCHAGHTICOKE
CEDAR RIVER FLOW RESERVOIR
WARNER L.
HARRIS L.
GRAHAM L.
CAMPBELL L.
CAMPBELL POND
GALWAY L.
GREAT SACANDAGA LAKE
NORTH HUDSON
BLUE RIDGE
SCHROON L.
PALMERTON L.
CHEESBRO L.
PHARAOH L.
BRANT L.
THURMAN L.
SACANDAGA L.
GALWAY L.
HARRIS L.
GRAHAM L.
CAMPBELL L.
CAMPBELL POND
BENSON MINES
BUREAS PONDS
RESERVOIR
HENRY POND
RESERVOIR
HENRY POND
CHAIR LAKES
RESERVOIR
ONOS FALLS
RESERVOIR
BOONDOCK
RESERVOIR
INDIAN LAKE
RESERVOIR
ELM LAKE
RESERVOIR
LAKE PLEASANT
RESERVOIR
PRECO LAKE
RESERVOIR
CEDAR RIVER FLOW
RESERVOIR
THIRTEENTH LAKE
RESERVOIR
TROUT BROOK
RESERVOIR
WARRENSBURG
RESERVOIR
SACANDAGA
RESERVOIR
SHUSHAN
RESERVOIR
TOMHANNOCK RESERVOIR
(Troy Water Supply)

DISTRIBUTION OF INCOME IN INSTALMENT FINANCE

A Mathematician Solves a Problem for Wall Street

By Otto C. Lorenz

DURING the last decade the invasion of business by the scientifically trained mind has been an invincible march. Everywhere can be noted signs of the conquest; there is a diligent searching for fundamentals, a thorough-going attempt to refine and improve today's practice, a successful striving for efficiency of operation, economy of material, and elimination of risks. An excellent example of the value of the scientific approach can be found in the field of instalment sales and finance, a field which in the last few years has become of major importance in the world's business. The work of the mathematician in reducing the number of indeterminate factors in instalment sales and finance has already gained considerable headway and some of this work has been described in an elementary way in various magazine articles by the present writer.[1] In this paper it is proposed to go a step further in demonstrating what mathematics can contribute to banking, and in particular to instalment finance.

There are innumerable ways in which the profit on an instalment transaction may be distributed over each instalment. Let us assume that we have a series of 12 instalment notes of $100 each due at monthly intervals. Let us assume that a finance company is willing to purchase these notes from us for $1,000. If we assume that all 12 instalments are paid in full when due, then the finance company's profit on the transaction is clearly $200. But it is also perfectly obvious that the finance company can not "count its chickens before they are hatched," — it can not be sure that its investment or principal will be repaid, not to mention its profit, until each and every instalment has been paid up. Then how much principal and how much profit is to be contained in each instalment? It is precisely at this point that an amazing array of systems are presented for distributing the profit and incidentally the principal of such instalment transactions. A discussion of the merits and demerits of all of these systems would require more space than the limits of this article permit. We can present only those systems which are in general use at present or which have been advocated by leaders on the subject and discuss their relation to certain fundamental concepts which underlie the entire scheme of affairs.

A system which may well be regarded as primitive and which has become practically extinct in this country, though it is still in use by certain European instalment finance companies, is here presented for the sake of contrast. This system does not spread the profit at all, but permits the total income on a certain transaction to be written down as profit at the time of making the deal. Thus the books of the company employing this system do not reveal the fact that part or all of the amounts written down as profit may actually develop into a loss as time progresses and the instalment transactions upon which the profits have been calculated fail to pay out.

To correct this misleading statement of the company's position, the accountant evolved a system of distributing a portion of the total profit contained in an instalment transaction into each instalment of the transaction so that each instalment consisted partly of profit and partly of principal. As time progressed and instalments were paid, the amounts of profit contained in the paid instalments were regarded as *earned income* and the amounts of profit contained in the unpaid instalments were termed *unearned income*. The sum of the earned income and the unearned income on a particular transaction were, of course, equal to the total profit, or *gross income*, on that transaction.

The first system to be advocated by the accountant was that of prorating the amount of profit over each instalment. If the instalments were equal, then each instalment would contain an equal share of the total profit on the transaction. Thus an instalment transaction consisting of 12 payments of $100 each, which amounts included a total profit of $120, would be regarded as an instalment transaction, each instalment of which would contain $90 of principal and $10 of profit. As payments were made, $10 of each payment would be allocated to earned income, $90 to repayment of principal, and the unpaid instalments would consist of unearned income and principal (or capital) outstanding in the same ratio. This method was easily introduced and its applications fairly understood by the employees of instalment finance companies throughout this country. It is in general use today and has been accepted, moreover, by the Federal Government of the United States.[2] This distribution gave rise to a series of capital turnover factors which have been described in some detail in another article.[3]

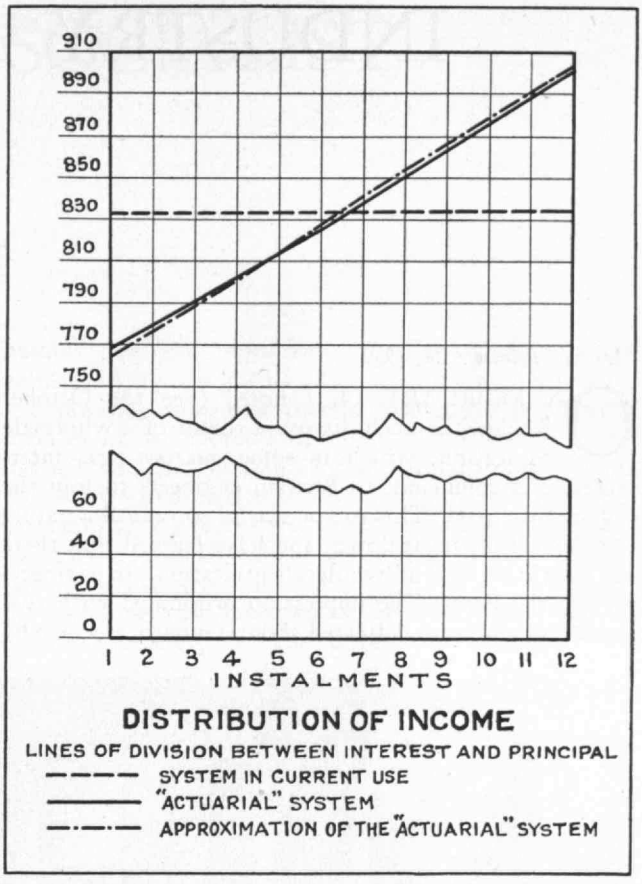
In the minds of a few of the leading accountants and mathematicians of this country there seemed, however, to be a discrepancy in this distribution of income. After all, a finance company is engaged in the business of lending money and its profit may in a sense be regarded as an interest charge for the use of that money. Systems were therefore developed in which this concept was recognized.[4] The profit, or interest, on an instalment transaction was now adjusted from instalment to instalment so that the amount of interest (or profit) contained in an instalment was based on the interval of time between each successive instalment and the amount of principal outstanding during that interval of time. Comparing this method with the foregoing method, it is to be noted that the earned income of this method is greater than that of

the foregoing method during the earlier months of the instalment transaction, whereas it is less in the later months. The total amount of each instalment, made up of interest and principal, is, of course, identical for one system or the other. This system, sometimes termed the actuarial system, involves a geometrical progression and renders it formidable to the employee of the instalment finance company unless he is taught the use of tables which govern this procedure. An approximation of this system has been developed which, nevertheless, remains about as formidable to the employee as the actuarial system, but which presents a possible advantage in that it uses an interest rate with which the employee is familiar.[5] In order that the reader may visualize the distribution of income under the currently employed system, the actuarial system, and the approximation of the actuarial system, the accompanying chart is presented for a transaction consisting of 12 instalments of $916.67 each, the total profit of the transaction being $1,000 and the total amount of the transaction $11,000. In the chart the space below each point of the curve represents the amount of principal in the transaction whereas the space above represents the amount of profit. In each case the total amount of principal for each system is $10,000 and the total profits are $1,000, the curves being distinguished only by their method of distribution of the income and the principal over the several instalments.

One other refinement of the actuarial system should be mentioned in passing. The mathematician will note that the finance company's volume of transactions is (supposedly) continuous. In other words, the total volume of business which may be transacted over any month should be treated on the basis of a certain daily or hourly volume of business and the distribution of earnings over the period of the company's activity may then be adjusted with this consideration in mind.

HAVING thus briefly described those systems of distribution of income most worthy of note we may devote our attention for a moment to items of expense and endeavor to determine whether these items may be classified in such a way as to bear some more or less constant ratio to these elements or factors which are employed in the distribution of income.

An expense item of major importance in the activity of an instalment finance company is that of cost of money in the shape of borrowed funds. It is perfectly normal for a finance company to borrow from two to four times the amount of its capital, or net worth, and employ these borrowed funds for the purchase of instalment "paper." The bank as a rule charges the finance company for the use of these funds at per annum rates on the amount and the outstanding time of the obligation. Evidently, if cost of loans were the only items of expense to be considered, a system of distribution of income such as the actuarial one would be more closely correlated with the expenses of the company, and might be said to give a fairer representation of its earning power, inasmuch as the actuarial system is equivalent to assuming that it costs so much per month of each dollar of outstanding volume based on the advances (purchases) made by the finance company, i.e., the total outstanding capital of the finance company.



THE HEIGHT ABOVE EACH POINT IN EACH CURVE REPRESENTS THE PROFIT OR INTEREST FOR THE PARTICULAR SYSTEM REPRESENTED BY THE CURVE. THE DISTANCE FROM THESE POINTS TO THE BASE OF THE CHART REPRESENTS PRINCIPAL

But cost of borrowed funds are not the only items of expense. It is possible for many other items such as cost of bookkeeping, collection, salaries, and so on, to be expressed as percentages of the volume of transactions rather than the amount of capital outstanding upon which the actuarial system of distributing income is based. Hence, a distribution of income which is in line with such expenses might be advocated as more accurately describing the income or earning power of the instalment finance company.

AT THIS point it will be interesting to introduce the Equation of Stability, which my colleague, Mr. Mott-Smith, first developed in connection with the problem of the automobile dealer. This equation is of extraordinary interest and importance and, in so far as we are aware, presents a fundamental, new development in the subject of instalment sales and finance.

For the case where all the capital is invested in the first month, the equation of stability for the automobile dealer is as follows:

$$\frac{B+\beta_1-\epsilon}{W}\left(\frac{C-E}{C}\right)+\frac{\gamma_1+\beta_2}{W}\left(\frac{C-E}{C}\right)^2+\frac{\gamma_2+\beta_3}{W}\left(\frac{C-E}{C}\right)^3$$
$$+\ \cdots+\frac{\gamma_n+\beta_{n+1}}{W}\left(\frac{C-E}{C}\right)^{n+1}-1\geqq 0$$

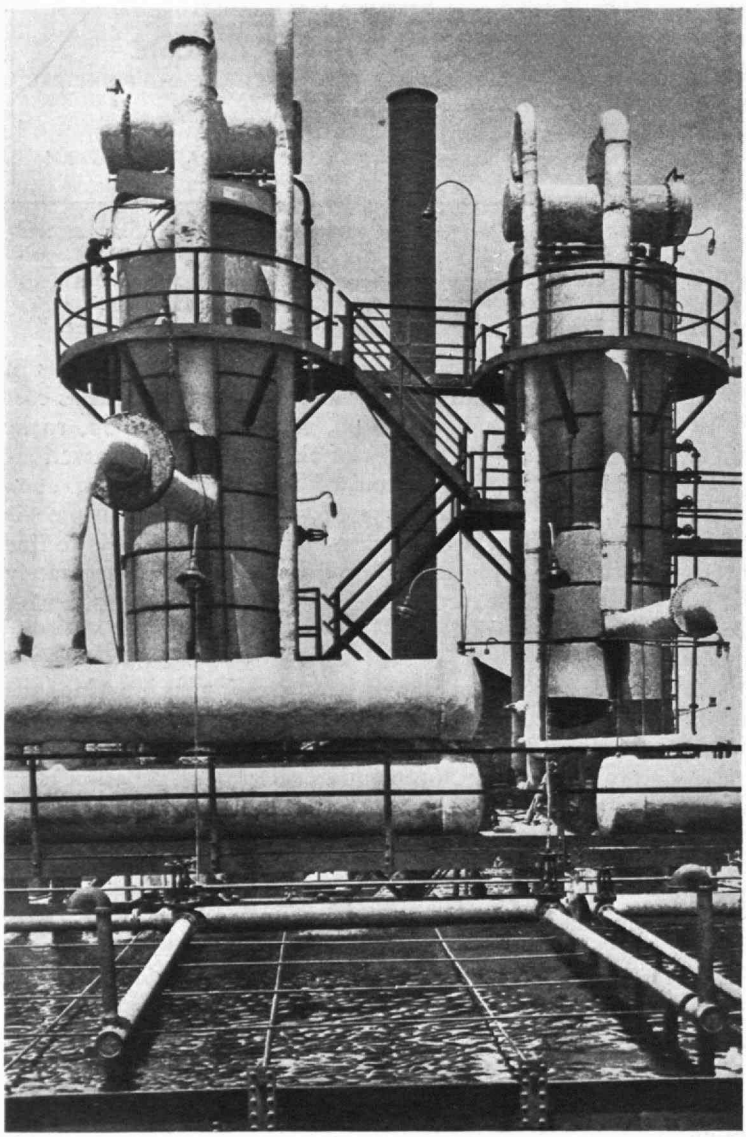
Here C is the amount of capital (*Continued on page 107*)

INDUSTRY AND ENGINEERING SOVIET

Part II—The Memoranda By An

Moscow, February 28, 1930

ON FEBRUARY 14, I noted (See the October Review) a much discussed rumor of a wholesale invitation, which in some quarters was interpreted as a command, to Russian engineers to join the Communist party. This rumor was of so radical a nature that I tried to run it down, and have learned that there has been at no time a "wholesale invitation" to engineers to join the Party. The impression originated with two important addresses delivered about a month ago: one by Koubisheff, President of the Supreme Economic Council, at Leningrad; the other by Rykoff, President of the Council of National Commissars, at Moscow, before the local engineering societies. Both speakers dwelt upon the great responsibilities placed upon the engineers, and the important part they have played, and will continue to play, in the economic and industrial development of the country. They referred to the sabotage and opposition that had been discovered repeatedly in the higher circles, which so far had failed to become reconciled to the new régime. They cited numerous instances where engineers of high standing had deliberately abused the confidence placed in them by crippling industries and embarrassing the government's plans for industrial development. Both speakers made an impassioned appeal to all engineers, whatever their political views, to carry out in good faith and in accord with the general policy laid down by the Supreme Economic Council, the tasks entrusted to them and the duties assumed by them. This places an entirely different construction on the so-called news, since it was an appeal for coöperation rather than an invitation to join the party ranks.



GRAVER SYSTEM OIL REFINERY, BUILT BY "AZNEFT," SOVIET OIL TRUST

In the 40-page pamphlet by the well-known economist, Krijanovski, entitled "Sabotage as it Exists," are given numerous extracts of depositions and trial records of engineers accused of sabotage during the past few years. The author states that during the last two years sabotage as well as counter-revolutionary organizations have been discovered in the ranks of prominent engineers, and that their wide activities and their manifest political aims could not have failed to attract the watchful attention of the government. He attributes the sabotage in engineering circles to their irreconcilable attitude toward the present régime, and traces the origin of their activities from the beginning of the civil war of 1918, with the constant strife between them and the existing government. He cites cases where these engineers, who were responsible for the management of important industries, were in close touch with the former owners of the properties, Russian emigrés and foreigners residing in Western Europe.

Whether this is true or not, it explains why in every large engineering project a member of the Party is stationed as a watch dog to guarantee that the enterprise shall be carried out to the best interests of the country. It would be unfair to accuse all engineers of sabotage, but under

IN THE UNION OF SOCIALIST REPUBLICS

Five Year Program

American Engineer

present conditions in Russia the innocent and the guilty suffer alike, and the trusted members of the Party who are placed over the executive engineering staffs prove only too often, because of their ignorance of the enterprise over which they are in nominal command, a great obstacle to their rapid progress and their satisfactory consummation. Undoubtedly some of the leading government officials realize this handicap, but with them it may be a choice of the lesser of two evils.

The universities are beginning to graduate young engineers, who, having grown up with the present régime, are loyal to it, but because of their inexperience and their distrust of the older and abler engineers cause considerable friction, and so unwittingly prove handicaps to the more rapid and efficient industrialization of the country. I have met a good many of the engineers of the old order, and have not seen the slightest indication of their not giving their best to their jobs. In this the government faces a serious problem, which it tries to solve by inviting foreign engineers and technicians to help them in their big undertakings. I am told that there are almost a thousand American experts alone now engaged in Russia in an advisory capacity. The problem is to select men of sufficient ability to be of real service to them, but because of their limited foreign exchange they are too frequently governed in their selections by the compensation involved rather than by the competence of the individual.

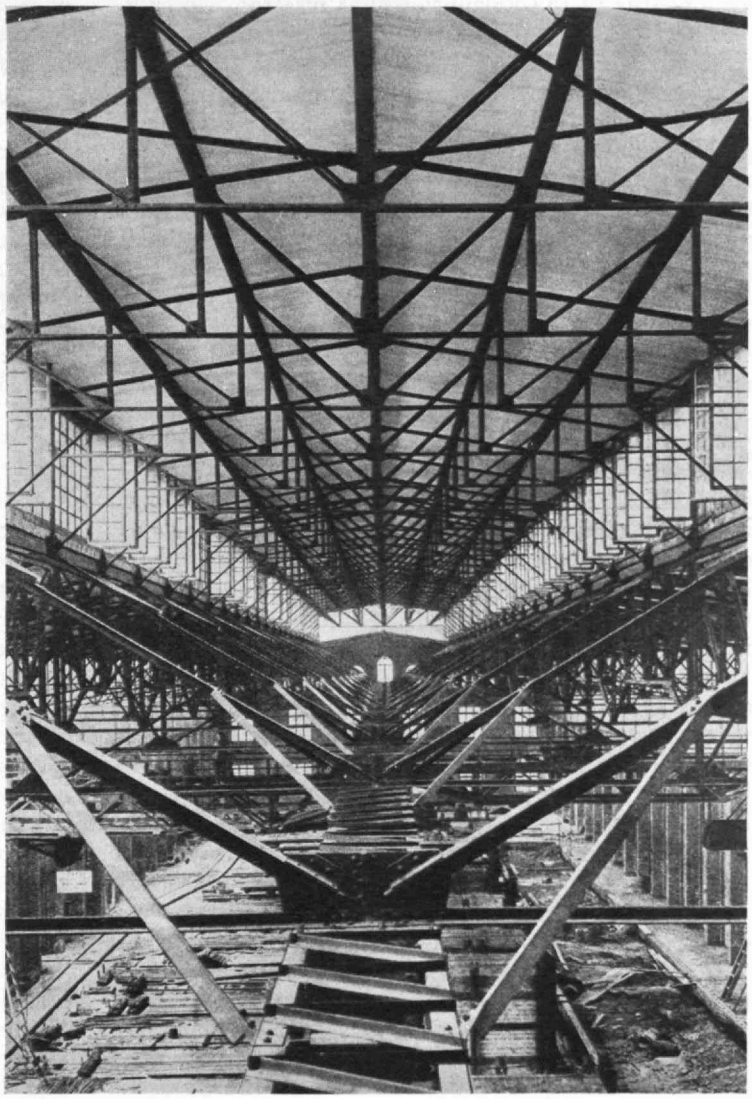
Moscow, March 4, 1930

Day before yesterday a message from Stalin, intended for the widest possible distribution, was published in all the papers under the caption "Heads Turned by Success." It referred to the great progress that has been made so far in the collectivization of the farms, and warned the Party not to lose its head, and not to press collectivization too far, since the movement can be a success only with the voluntary co-operation of the farmers. He stated that fully 50% of all the farms had already been formed into collectives and that in many regions the farmers are not yet ready for this movement, and should be left alone.

Some people have interpreted this as a swing of the Party to the Right, but Duranty does not think so, and I am inclined to agree with him. It seems to me that having succeeded so quickly in bringing 50% of the farms into collectives — which Stalin claims is twice the number they had hoped for — the Party prefers to consolidate its gains and call off all strong arm methods.

I saw my first Red funeral yesterday, probably a member of the Supreme Economic Council who died a day or two ago. The coffin and the hearse were a flaming red, and were covered with flowers. Four people preceded, carrying large wreaths with inscriptions, and following the cortège was a band of music and some 50 people. All bodies are cremated.

New American faces show up every day, mostly engineers engaged by the government. Most of the foreign engineers and experts on their arrival here are



CONSTRUCTION OF THE SOVIET "ELECTRO-STEEL" PLANT, NEAR BOGORODSK

extended a very cordial invitation by the Chamber of Commerce of the U. S. S. R. to address it on the subject on which they happen to be most expert. This Chamber of Commerce has organized various sections such as the American-Russian section; the German-Russian section; the British-Russian section, and so on. Its headquarters are in the former sumptuous Stock Exchange Building. I dodged an invitation last winter, but did not succeed in doing so this year and so about a week ago I talked before the American-Russian Section of the Chamber of Commerce of the U. S. S. R. on some recent phases of American railway development. At the end of my 40 minutes' talk, which was given in the evening, there was a recess during which refreshments were served and afterward, as is usually the custom, I was asked numerous questions of a character and variety that tax one's fund of information.

March 20, 1930

Another step in the direction of rational industrial management is the order recently put into effect giving managers full authority, *yedinonachalie* (single management) the Russians call it. Heretofore, everything has been managed by a committee. The Workmen and Soldiers Committee was the supreme authority during the first months of the Revolution, but was too unwieldy and had to give way to a responsible dictatorship centered in a few men.

Industry was likewise managed by committees of working men, who could depose the responsible chiefs and generally impair their authority and efficiency, and consequently through all these years of struggle and development there was a constant conflict between the nominal managers and the workmen's committees. The "wall papers" (bulletins and posters) about which I wrote you last year, and which were in evidence in every commercial, banking, and industrial institution, were the means employed by the committees to criticize or condemn the management. So long as the criticism was fair, and of a constructive nature, the "wall paper" served a useful purpose; but it could not long be maintained at that level and soon developed into a vindictive and destructive force which gradually began to undermine the organizations. The cartoons with their bitter gibes and open accusations posted on the main stairway of the State Bank Building, where everyone stopped to read, could not fail to weaken the people's confidence in the men who were in charge of the country's great financial institution, however little foundation there might be in the criticisms themselves. Human nature is much the same all the world over, and the petty jealousies, prejudices, and bitter recriminations, which have hampered the Russian leaders so seriously, remind one of the obstacles placed in the path of the early American patriots who, with perhaps no greater zeal, were struggling for a new political ideal. All too often, I am told, because of this suspicious attitude, have men of real ability and earnestness been removed from important posts by employees' committees or by party members at the annual "purging" meetings. Unfortunately these "wall paper" attacks and party "purgings" most frequently are aimed at men of independence of thought and action, merely because they happen to belong to the intellectual or the formerly well-to-do-classes.

No matter how one may feel about the theories and experiments of this group of men, it is impossible not to admire their speed and thoroughness of retraction, when once they see that they have been wrong. And so in this matter, almost overnight they have changed from what might be called multi-management to an extreme form of autocratic management, which I should not be surprised to see them carry much farther in their industrial management than would be permitted by our own labor unions.

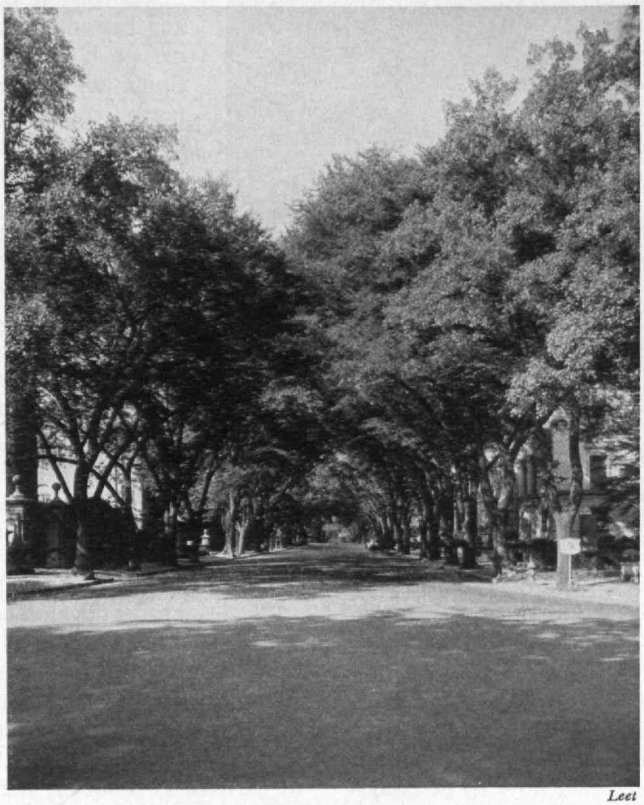
April 24, 1930

Last year while I was here the great topic of discussion everywhere was the now well-known Five Year Plan. This plan provided two alternatives with a minimum and a maximum budget, ranging from 27 to 32 billion dollars for the five-year period. After weeks of discussion the maximum budget was adopted, and on May 1 ratified by the Fifth Congress of the Soviets. Industrial and railway expansion were emphasized, although provision was made for agricultural expansion and farm aid.

This huge budget appeared fantastic, and many rightly questioned the possibility of carrying it out. Especially abroad was the prediction freely made that it would remain a paper plan, a hope unrealized. The results of the first year of operation have far exceeded the fondest hopes of the sponsors. Actual production in industry increased over the previous year by 23.7% as against the 21.4% set as the goal of attainment. Capacity of electric power stations increased by 20.3% as against the 14% indicated; gross freight handled by the railways increased by 21% instead of the estimated 10.1%. Similar results obtained in other branches of the national economy have led to their advocating that the five-year program be carried out in four years. During the first few months of the present fiscal year this higher goal has not been attained, but under the spur of necessity to meet a constantly growing and urgent demand for manufactures and products of all kinds the operation of plants is being speeded up, and with reasonable assurance of success.

In this Five Year Plan agricultural improvement and expansion were given their proper place, but it was not until this winter that the plans then contemplated were matured and the machinery set in full motion for their ultimate fulfillment. Ever since my arrival in Moscow, on January 23, the newspapers have had almost daily articles on the agricultural problem and its solution, which is collective farming. The peasant and his land have been a problem in Russia for centuries. Alexander II attempted a solution in 1861, when the serfs were partially liberated. The Russian peasant's hunger for land was not satisfied, however, and it was the clever slogan "Peace and Land," and the promise to divide the land among all the peasants, that enabled Lenin and his party to gain control of the government during the October Revolution, and the large estates were actually divided among the peasants who had formerly worked on them. To insure an equitable division, these estates were divided into small parcels of land of various grades, and as a result many farmers had their several parcels of land at considerable distances apart. Each small strip of land was separated from its neighbor by a ditch, and it is estimated that there were 27 million such little farms. (*Continued on page 104*)

The City Beautiful Becomes the City Vital



Leet

LOWER NEW HAMPSHIRE AVENUE WITH ITS ARCHING ELMS AND STATELY HOMES. WHAT IS THE STORY OF THE ENGINEERING BEHIND IT?

THE WASHINGTON NOBODY KNOWS

By George A. Ricker

THAT Washington occupies a place high up in the list of the world's most beautiful cities is a fact well known to all Americans; that it has also attained an enviable position by virtue of its achievements in city engineering and city planning is a fact not so well known or understood. The city beautiful has become the city useful; its population of a half million or more is no longer expected to exist on beauty alone. In this era of unregulated city growth with its concomitant evils of noise, congestion, and stench, Washington is emerging as the antithesis of all of this — a livable, healthy, useful city.

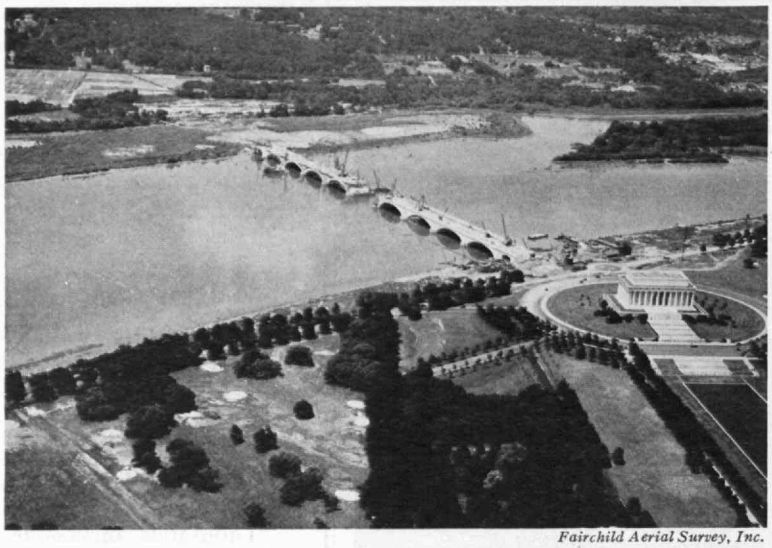
When in 1791 Major Pierre C. L'Enfant's Washington included only nine and one-half of the District's 100 square miles and his plan covered thousands of unoccupied acres, the problems of sanitation and communication were comparatively simple. President John Adams could bathe in the waters of the Potomac in the back yard of the White House and southern congressmen guided their mounts between ash heaps and around mud holes on Pennsylvania Avenue to the Capitol.

After "Boss Shepherd" took the town by the nape-of-the-neck and shook it down for a few millions of needed improvements, it was a much healthier place to live in and had what every well-regulated town today has — a good-sized mortgage to pay off. The town soon outgrew its L'Enfant clothes and stretched its legs and arms out into the lovely hills and vales of the District. Unguided, misguided, it grew, for the time being misshapen and disorderly until sheer necessity brought forth the McMillan plan of rearrangement in 1901. As so often occurs, the *plan* seems to have allayed discontent and nothing much happened to put it into effect. Many years passed and the big, overgrown village, the stepchild of Congress, needing its streets straightened, connected and paved, its sewers enlarged and lengthened, a new water supply, more parks and bathing facilities, found itself all at once the capital of a world at war.

Thousands on thousands of patriotic young men and women and "dollar-a-year" men came and camped out. It was an era of five or six girls in a room, cooking their own meals on a small stove in the basement, boys bunked in two and three-storied cots and grub staking themselves at chain store groceries with food at war prices and "no meat" and "no heat" days every week, and then the flu. Who can forget it? Two or three of the five girls in the one room were gone in a day or two; the boys, mostly those winnowed out of the draft as unfit for military service, fell one by one. All that our own devoted women of the great Red Cross could do did not alleviate conditions much, and the slaughter "behind the lines" right in the world capital went on until the dread malady spent itself with an appalling death toll.

It is not pleasant to think about, but it helped to awaken the people of Washington and Congress to the physical needs of the overgrown village that had so quickly become a great city. Full speed ahead was ordered, temporary housing was provided, and civil and military authorities coöperated to improve sanitary conditions. And just as some order was evolving from the chaos of neglect, Armistice Day came, the pressure of great necessity was withdrawn, and the camp began to demobilize.

Held by the charm of Washington, many of its war workers stayed, adding materially to its permanent population. Temporary governmental control and regulation of business instituted under war conditions was to some extent made permanent, and commissions and



Fairchild Aerial Survey, Inc.

ARLINGTON BRIDGE ACROSS THE POTOMAC, CONNECTING LINCOLN MEMORIAL WITH ARLINGTON CEMETERY, 1,858 FEET LONG AND ONE OF THE WORLD'S FINEST EXAMPLES OF STONE ARCH SPANS. ANOTHER OF AMERICA'S GREAT MASONRY BRIDGES, THE CABIN JOHN, IS NEAR WASHINGTON

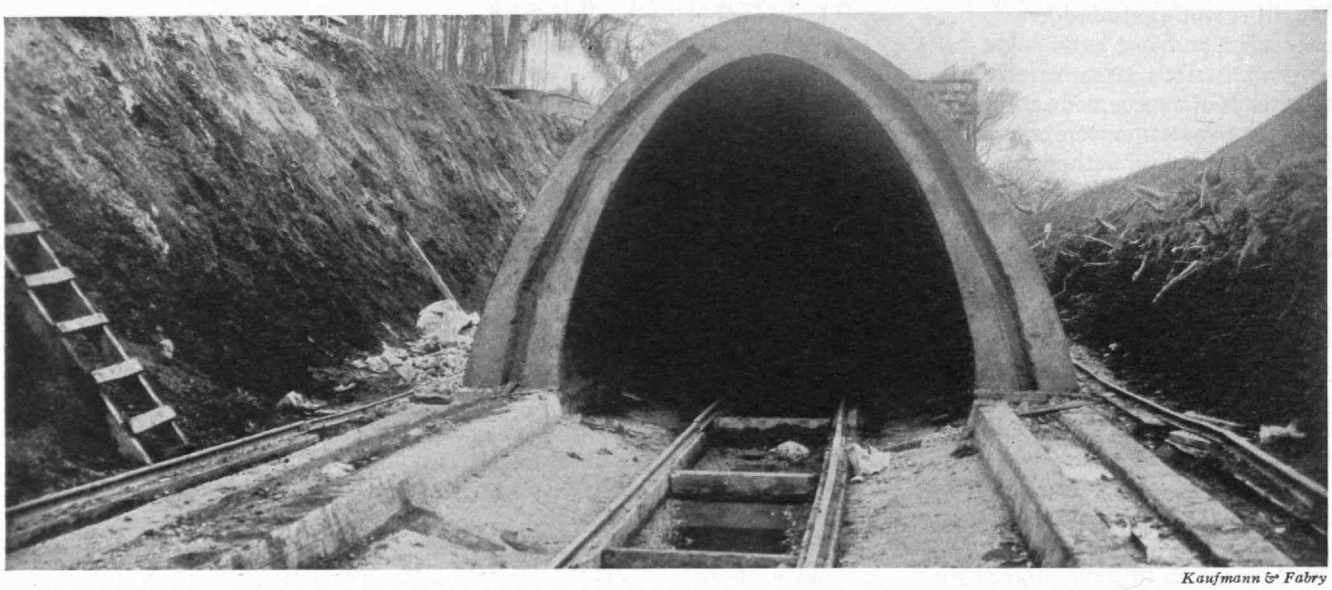
departments, created hurriedly, were reorganized and housed for peace time service in the temporary buildings erected, for the most part, on park lands.

Measures and methods in effect to care for the health of the people in the war growth had now to be reconsidered and made operative for a greatly increased permanent population and an enlarged business community. Public utilities, which before the war had reached their maximum of usefulness, demanded immediate extension and enlargement. The overgrown village had become in two short, hectic years a great throbbing center with new hopes and ambitions, and the people demanded physical and spiritual improvements commensurate with their new life. Above all, the health-giving and health-insuring utilities which had been overworked had to be immediately enlarged to meet the new needs.

Realization that Washington needed more and better parks led to the creation, in 1924, of the National Capital Park and Planning Commission which two years later was given power to acquire additional lands and was charged with the duty of supervising the McMillan highway plan of the District and the preparation of a complete and coördinated plan of the Nation's Capital and the region surrounding it through coöperation with the adjoining states of Maryland and Virginia. A sub-committee of the Commission known as the "Coördinating Committee" made up of district and federal officers and a representative of organized citizenship devoted itself to the modification of the highway plan to provide better traffic facilities and adjustment of the street system to natural topography and park boundaries.

Colonel U. S. Grant, 3d, in describing the work of the commission for the suitable and proper development of the city's facilities says, "The natural advantages of the site and location selected by the President to whom it is a living memorial are such that to the utilitarian features may be added, at relatively reasonable cost, the embellishment which, with the preservation and suitable development of its natural beauties, will make it 'express the soul of America' and when viewed by an American citizen will arouse his imagination and stir his patriotic pride."

For 75 years, after Major L'Enfant conceived his plan in 1791, the city, beyond the nine and one-half square miles encompassed by Boundary Street (now Florida Avenue) was without a plan. Without reference to the original plan, property owners in this new area gaily subdivided, ran lot lines, cut grades and otherwise carried on in a manner which inevitably resulted in a patchwork puzzle of property, wholly out of relation to anything else in the District. The street plan developed



Kaufmann & Fabry

THROUGH THIS TUNNEL OR CONDUIT, SHOWN HERE UNDER CONSTRUCTION, THERE CAN FLOW INTO THE CAPITAL 100,000,000 GALLONS OF WATER EACH 24 HOURS. THE OLD CONDUIT, WHICH IS UNDER THE ROADWAY AT THE LEFT OF THE PICTURE, HAS A DAILY CAPACITY OF 82,000,000 GALLONS. DELCARLIA RESERVOIR, A PICTURESQUE NATURAL BASIN AT THE DISTRICT LINE, RECEIVES THE FLOW OF BOTH AQUEDUCTS

was so out of joint with actual city requirements that Congress in 1893 ordered the preparation of a highway plan which would govern the remainder of the District. The L'Enfant gridiron and superimposed plan of diagonal streets was then extended out over the entire territory.

Power to change further the existing plan has been vested in the Planning Commission, carrying with it also power to regulate street area dedication and condemnation. This authority has been exercised to bring about desired changes in topography, drainage conditions, or street and park boundaries. Many additional changes in existing terrain will be required before the major street plan for the district is carried out to a successful conclusion. By virtue of the plan of 1901, the Lincoln Memorial, Union Station, and Arlington Bridge projects have been brought into successful and harmonious relationship with other elements of structural Washington. The Mall, Lafayette Square, and the Triangle are other units of the general scheme which in time will testify further to the excellence of the 1901 idea.

The avenues of the L'Enfant plan bearing the names of the states have now been extended beyond the limits of the original city, in some cases all the way across the District to the Maryland line, making connection with the main roads of that state and thereby affording ready entrance and exit to and from the center of the District for the thousands of tourists who from East, North, and West must cross Maryland to reach the National Capital. Straightening and widening these thoroughfares has greatly facilitated the constantly increasing volume of traffic.

A notable case in point is Rhode Island Avenue, which by agreement with "The Old Line State" has now been projected to the eastward to provide for more direct connection with U. S. Route No. 1, over which thousands of cars pass daily between north and south. Another important extension now in process of development is that of Sixteenth Street which leads directly north from the White House and Lafayette Square in the center of which is located the extraordinary statue of General Jackson mounted on a prancing steed with curly mane and tail. Where Sixteenth Street crosses the District line into Maryland it is planned to build a beautiful gateway with a triumphal arch or other suitable form of memorial.

In the old city, now downtown Washington, many of the "gridiron" streets devoted entirely to business have had their roadways widened from 30 or 40 feet to 60 and 80 feet. This, accomplished by borrowing sidewalk space which was often 25 or 30 feet in width, was done against the noisy protests of older Washingtonians who were grieved at the removal of many trees that had been planted and nurtured since the village days. The extraordinary growth of the capital in the decade has made necessary such drastic surgical operations to meet the demands for business and to relieve traffic congestion. To the everlasting credit of the Federal and District governments immediate replacement of the trees has been made and, wherever possible, trees of a finer and sturdier character were planted, and are being carefully guarded and cared for by the District Forester.

In the decade the District has made rapid strides in the matter of securing more and better pavements. On June 30, 1919, the records show that there were in round numbers 7,352,000 square yards of street pavements of different classifications. On the same date in June, 1929, the record was 8,606,000 square yards, a net increase of over one million and a quarter yards, or 17.1%.

In order of precedence for yardage built during this 10-year period in excess of existing yardage, sheet asphalt on concrete shows a growth of 11.8%; cement concrete an increase of 775%, and macadam a decrease of 29.2%. The astonishing record made by the concrete type is due to the fact that practically all streets previously unpaved were improved with this material in the decade and most of the decrease in macadam was due to replacement with more permanent pavements.

It has long been the rule, by custom and law, that streets in the District, once paved, shall be renewed with the same material; in those streets in which in the early days macadam had proved adequate, automobile traffic of later years demanded a more substantial type. In street widenings the added width of pavement has been of the same type as the old. In the extension of main thoroughfares through new territory the new pavement has been almost invariably of cement concrete. Of the 619 miles of streets now improved 369 miles are of asphalt, concrete, or macadam, 67 miles are of various kinds of blocks and other miscellaneous types, and 183 miles temporarily maintained with gravel surfaces.

THE parks of the District have been skillfully developed in widely separated areas, utilizing picturesque Rock Creek and its branches, and other sections almost too rugged for domestic uses with results altogether charming, but it yet remains to connect these beauty spots by parkways passing through the changing scenes of frowning cliffs and rolling lowlands to tidewater levels at Hains Point and the yacht harbor. Rock Creek drive, soon to be completed, will pass under the so-called million-dollar bridge on Connecticut Avenue and into Potomac Park at the great circle about the Lincoln Memorial and the water gate now being built at the northern end of the Arlington Memorial Bridge.

The complete union of North and South, accomplished in the minds and hearts of the people in the half century which has elapsed since the war between the states, is about to be sealed by the completion of a permanent bridge spanning the Potomac and re-uniting with bonds of stone and steel the lands that were for a brief period separated by this noble river.

The McMillan plan stressed the importance of Water Street as a connecting link in the boulevard system between Potomac Park, the War College, and Anacostia Park. Present plans of the corps of engineers contemplate the building of a bridge across the waterway connecting the tidal basin with the Washington channel which will provide a driveway joining the so-called speedway around Hains Point with Water Street.

It is entirely feasible to combine commercial and boulevard features in Water Street, which borders the Washington channel for about a mile between the tidal basin and Washington barracks. The principal activities of this water front are the lines of steamers to Norfolk and to points on Chesapeake Bay and the lower Potomac. The harbor police station and the District fire department steamers are located here. The *(Concluded on page 94)*

THE TREND OF AFFAIRS

Exit Shale Oil

CHARGES by Ralph S. Kelley of the Department of the Interior that the government's shale oil reserves in Colorado are not being properly conserved raise the question of the value of shale as a source of petroleum. The United States, without its shale reserves, already has petroleum far in excess of its needs, and the constant discovery of new wells by the methods of geophysics assures a supply for many years to come.

With oil wells, therefore, everywhere being held in leash by a national curtailment program resulting from overproduction, the commercial production of oil from shale becomes, so far as the United States is concerned, a dream of the future, a fantasy of the present. The oil requirements of the United States are approximately 2,600,000 barrels a day; the available supply from potential sources is several times this figure. In one field alone, the famous Yates Pool of Texas, it has been shown by opening the wells for one hour a month that from this vast reservoir oil would rush at the rate of 4,000,000 barrels a day. The actual production from this field under the curtailment program is held down to 105,000 barrels daily.

The hydrogenation process of oil refining now being exploited makes possible a tremendous increase in yield, and at once interjects a new factor of economy into production. In fact, the belief has been voiced that hydrogenation will be applied to the production of oil from coal long before it is found desirable to develop the shale oil deposits.

Granted that more efficient methods for producing oil from shale are possible, another serious obstacle stands in the way of commercial utilization of these reserves. In processing the oil shale, the material is crushed and then subjected to great heat in retorts from which the gases are led to condensing machinery. Here lies the great problem, for water is precious in regions where oil shale is found, and unlimited quantities of cold water are vital to economical production.

Oil, as such, is found in very few of the so-called oil shales. The substance from which the oil is produced is kerogen, bituminous matter from which oil is produced by chemical change. The generally accepted theory has been that oil bearing shale was the source of the present petroleum pools and that the existing shale represents deposits from which the oil has not yet been discharged, The oil yield from shale varies according to the locality, from a fraction of a barrel, to several barrels of oil to the ton.

It is estimated that nearly 400,000,000,000 tons of oil bearing shale are available in the United States. It is found in an area of 86,000 acres in Colorado, 2,696,000 acres in Utah, and 460,500 acres in Wyoming. Only a small part of this area lies in the naval oil reserve. As for the petroleum reserves which have been developed by the government, the Elk Hill, Calif., field is estimated to contain 600,000,000 barrels. Reserve Number 2, at Buenavista, Calif., has a possible production of more than 100,000,000 barrels, and the famous Teapot Dome Reserve, which is Number 3, holds some 20,000,000 barrels. A fourth undeveloped reserve lies in Alaska.

With these being held for the future and with the probability that still other sources of oil will be discovered, it seems reasonably certain that the nation's oil shale fields will long remain the home of the coyote and the cactus.



United States Rubber Company

MILKY LATEX AS IT DRIPS FROM THE RUBBER TREE. AFTER A PRESERVATIVE IS ADDED IT IS SHIPPED IN LIQUID FORM

Rubber Milk

HALF way around the globe from Akron, Ohio, lie the lush, exotic lands of the Middle East — the Malay Peninsula, Burma, Java, Sumatra, Borneo, Indo-China, Ceylon. Here in the rubber isothermal zone, teeming with the world's cheapest labor, 7,000,000 acres of rubber trees are cultivated. These trees, yielding a milk-like fluid called latex, originated in Brazil as a result of a stupendous exchange in the world's agronomy. About 1875 coffee trees in India and Ceylon were ravished by bugs, and rubber trees in Brazil were neglected by an indifferent people. Brazil had no coffee bugs and Ceylon no rubber trees, so Sir Henry Wickham, under the auspices of the Royal Botanical Gardens, Kew, England, violating laws and outwitting nature, transferred seedlings of the *Hevea braziliensis* to Ceylon. They flourished there, and thus Brazil lost its supremacy in rubber to the Middle East just as it gained supremacy in coffee.



Blackington

NOT OSCILLOGRAPH CURVES, BUT THE SPIRAL COURSES OF CLIMBING ROCKETS OVER THE INSTITUTE'S DOME

Labor conditions and climate make it necessary that rubber be produced 12,000 miles from its principal point of consumption, but labor and climate have not dictated the form in which it shall be shipped. For years, rubber latex, coming from the trees drop by drop, has been gathered by natives and then coagulated; that is, the 30% or more of solid matter is separated from the milk-like liquid and dried, forming crude rubber. This crude rubber in the form of "hams," sheets, or crêpe is then shipped to Akron and other manufacturing points. But why not ship the rubber milk in its easily handled liquid form?

Because of its similarity in another way to cow's milk: it spoils quickly and for years no way could be found to preserve it — not, at least, until some minor Pasteur conceived the idea of adding two to five per cent of ammonia to the latex. This solved the problem, for it kept latex in a stable condition for months. The United States Rubber Company took the lead in preserving and shipping latex, and during 1929 more than 10,000 tons were brought into the United States.

The nub of the matter is this, however: latex can be used for a great variety of purposes that crude rubber cannot be. In fact, it is creating new materials, new industries, in a manner comparable to the development of plastics as described in the October Review.

After adding to latices (the plural form of *latex*) materials to modify their color, stability, viscosity, and texture, they are used in preparations such as can-sealing compounds and cloth and leather cements. The Dewey and Almy Chemical Company has two plants in America, two in Italy, and one in Canada utilizing latex for can-sealing. In England a latex paper is being manufactured with unique qualities of strength, water-tightness, and insulation. The latex is mixed in with the paper pulp with the result that the beating necessary is reduced by half, a great advantage in addition to the desirable effects produced in the quality of the final paper.

"Ditmarising," a patented process, uses latex to coat the filling materials of mattresses and cushions, increasing their strength and durability and rendering them immune to moths. Latex has been applied as a preservative coating for masonry, for making rugs non-slip on polished floors, in preserving wood, and making pipe joints. Cord tire fabric treated with latex seems to be superior to the rubberized variety, and vulcanized latex is a material of extraordinary strength. Surgeon's gloves made of it are said to resist 15 or more sterilizations. Leather substitutes and artificial lumber containing latex are other achievements with this material. The Dewey and Almy Chemical Company are now manufacturing soles and heels from fiber impregnated with latex, and in addition are producing battery separators and filter mediums utilizing it. Another company is making latex brake lining and clutch facing.

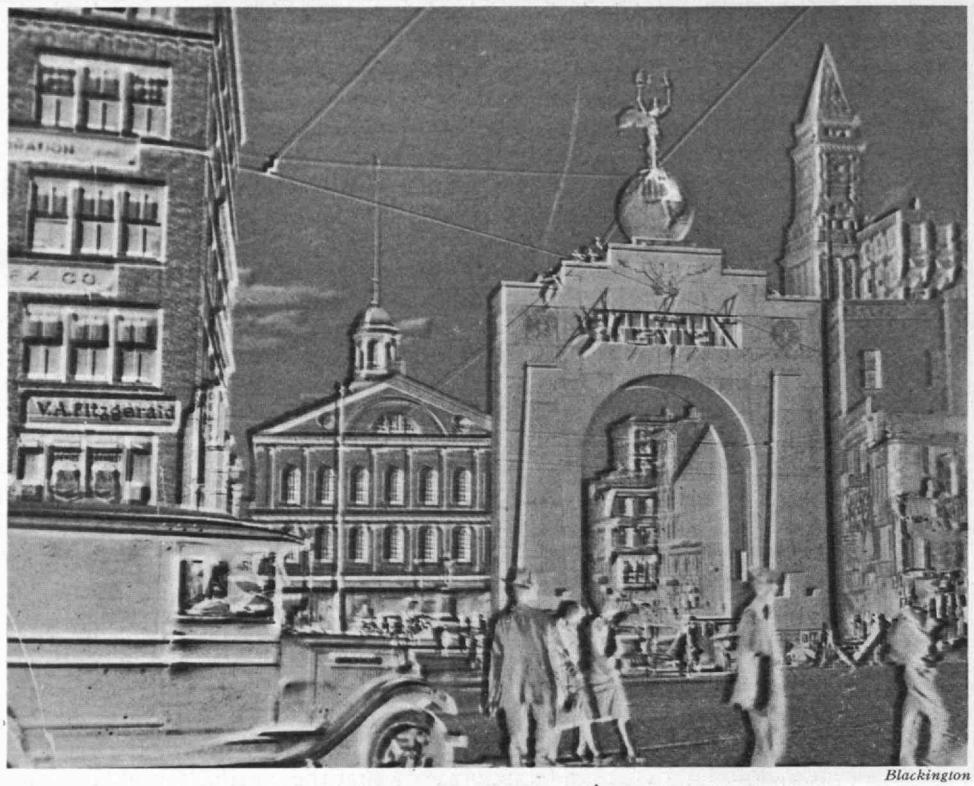
It can be seen readily that the possibilities of latex are enormous; no enterprising industrialist or financier can overlook the advent of the substance. There are difficulties to be overcome, of course, but its advantageous applications are constantly increasing.

It is unfortunate that the early rubber workers were unsuccessful in preserving and shipping latex. Had they been able to send it to America, our rubber industry might be much different. A prominent rubber technologist is authority for the statement that if latex had been available at the beginning of the industry, much of the present-day, cumbersome, and expensive machinery would never have been developed.



United States Rubber Company

CARRYING LATEX FROM TREES TO COLLECTING SHEDS WHERE IT IS COMBINED WITH A PRESERVATIVE



Blackington

RELIEF PHOTOGRAPHY, A CAMERAMAN'S LATEST TRICK

Transplanted Oil

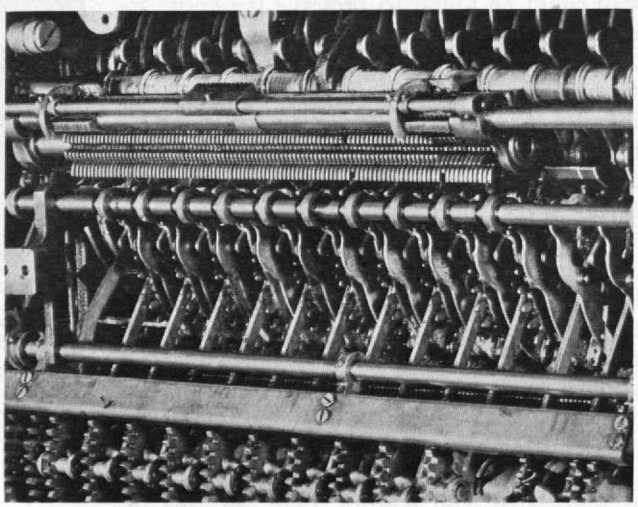
ASIDE from people in the paint and varnish business the mention of tung oil means but little to the ordinary American unless he happens to live near the Gulf of Mexico. Yet it is our fourth largest chemical import today, and because of tung oil the repainting of an automobile, which formerly took as much as six weeks, can now be done and done much better, in as many days. Nearly 60,000 tons of it, valued at $15,000,000 will be brought to the United States this year in tankers from the Orient. But beginning in 1931 the amount imported may be expected to decrease; not that its uses will diminish, but because tung oil is grown rather than mined and because of the faith of the Roosevelt administration, since justified, in the practicability of transplanting *Aleurities cordata*, or tung trees, from China to Florida, a feat fully as difficult as the transplanting of rubber trees.

Known sometimes as China wood oil, tung oil was imported into the United States as early as 1871. Although it had long been used by the Chinese as the basis of their exquisite lacquers, American varnish makers accorded it little attention until about 1900. Like many other things, it owes much of its present-day prominence to the automobile. Foreseeing in 1905 that a domestic source of the oil would be highly preferable to dependence upon remote and erratic foreign growers — the memories of the Boxer Rebellion were still green — an enterprising Department of Agriculture in 1905 set out tung tree seedlings in Florida. Ever since they have been spreading over the Gulf States, for up to now most of the seed has been used for further plantings.

The appetite of a growing automobile industry, the multiplication of tung oil's possible uses in the manufacture of linoleums and oil cloths, enamels, insulating compounds for brake bands, and as a replacement for copal varnish (seriously dependent upon the gum of the diminishing Kauri pine of New Zealand), together with unsettled Asiatic conditions, have constantly encouraged the building up of a domestic source of supply in the 25 years that have passed by since the initial venture in Florida.

In China, the pale yellow or "white tung oil" for export is prepared by roasting the seeds of the tree, then coarsely powdering them, and, after they have cooked, expressing the oil in wooden presses. Chinese tung oil has the highest refractive index of all known fatty oils and, with the exception of castor oil, the highest specific gravity. The readiness with which it becomes polymerized, setting to a hard jelly on being heated for a short time to 250 degrees C., is its characteristic chemical property. Its pronounced rapid drying quality is what renders it highly suitable for use in the manufacture of varnishes to which it imparts a brilliant, hard, and lasting surface.

The trees bear at three years and reach their prime at an age of eight or nine when each yields about four bushels of unshelled nuts, enough to make 30 pounds of oil. Normally, in the United States, 60 trees are planted per acre, the value of the crop being about $200. Tung tree plantings in the coastal districts of Mississippi and Louisiana are soon to be more than doubled from 3,000 acres to 8,000. One company near Wiggins, Miss., is said to have 400,000 nursery tung trees available for expansion of its orchards next January and February. At



Davis

VISCERA OF A CASH REGISTER; A STUDY IN REPEATING DESIGNS

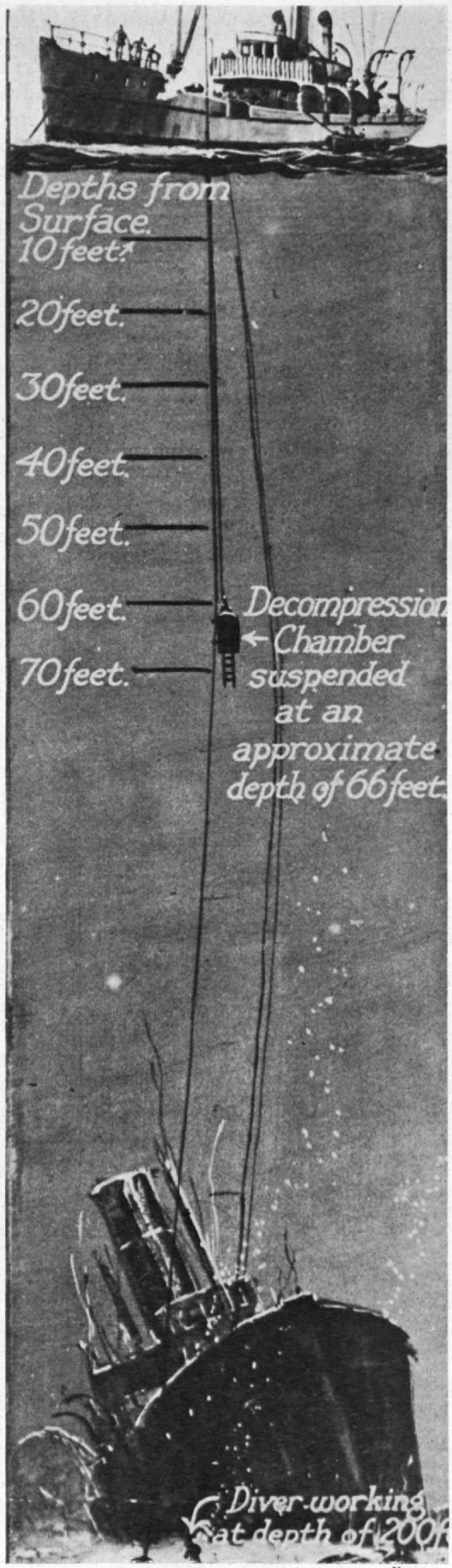
a large plantation in Alachua County, Fla., a crushing plant with an annual capacity of 70,000 pounds of nuts has been placed in operation. So far as is known tung trees are not subject to any disease of insect pests, which is a decided recommendation to farmers who have experienced Mediterranean fruit flies, Japanese bettles, or boll weevils.

Not only has the practicability of growing tung trees in the southern United States been demonstrated, but extraction machinery has been perfected to produce a larger and clearer yield of oil than is obtained by the crude processes still in vogue in China. Scientific care in the cultivation and fertilization of the trees likewise indicates that a domestic oil of a superior sort will become available in increasing quantities to displace the imported product.

The Battle of the Rays

MODERN physics may be said to have begun in 1895 when Professor Wilhelm Konrad Röntgen (1845–1923) accidentally discovered x-rays. In the 35 years that have elapsed, scientists, traveling on the uncharted seas of radiation and radioactivity, have revealed a new world. Explorations into this scientific wilderness have hardly started and every day brings new discoveries. A list of the more understandable ones reported during the past month gives evidence of the fruitful activity that prevails:

1. Using gamma rays emitted by radium, scientists working in the U. S. Naval Research Laboratory have "looked" through steel girders and plates to determine the presence of weaknesses and defects. With a bit of radium hardly larger than the size of a bean, it has been possible to sensitize a photographic plate on the opposite side of a battleship's hull, a feat impossible with generally available x-ray equipment. This gamma light photography, requiring nothing like the cumbersome equipment necessary in x-ray photography, will reveal defects in a metal as small as two per cent of its thickness.



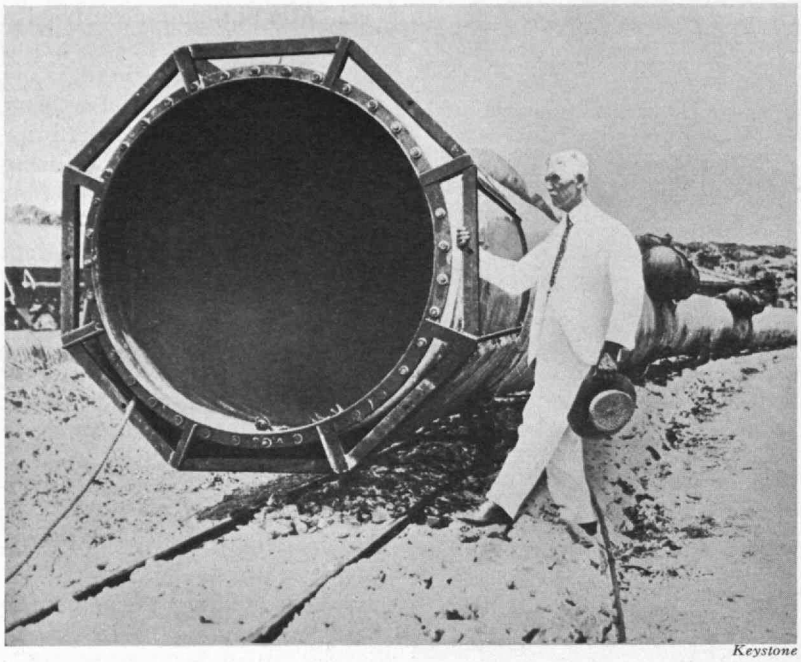
Keystone

DIVING FOR OLD GOLD, UTILIZING A SUBMERGED DECOMPRESSION CHAMBER IN WHICH THE DIVER REJUVENATES ON HIS WAY UP AND DOWN

2. Almost simultaneously with the demonstration of the usefulness of gamma ray photography came the production of a giant x-ray tube at the California Institute of Technology, utilizing 600,000 volts, or more than double the voltage used in present "available x-ray equipment." Giant tubes such as this one may emit rays that have the theraputic value of radium rays, and that will penetrate two inches of lead and two feet of concrete. Gamma-ray photography may not be so superior after all.

3. Professor Robert A. Millikan, working far up in the invisible spectrum from the comparative long wave gamma and x-rays, has been stalking the more elusive cosmic rays. His recent investigations indicate that they are not high speed electrons but ether waves of exceedingly high frequency. If they were electrons, the rays' reception on earth would be influenced by the magnetic polar regions. To test this, Dr. Millikan took the electroscope with which he measures the rays to Churchill, Canada, only 875 miles from the North Magnetic Pole. He made observations every day and night for a week, found the intensity of the waves the same in Churchill as it was in his home in Pasadena, and concluded that cosmic rays bombard the whole earth equally. He also suggested that, since cosmic rays are affected by small changes of density in the air, the cosmic ray electroscope could be used to supplement the barometer in collecting information about the weather.

These three developments in the course of a month represent but a fraction of the discoveries in modern physics that are revealing the unseen activity of the universe. Sir J. H. Jeans, in discussing Millikan's cosmic rays, has speculated thusly on what it all may mean: "In a sense this radiation is the most fundamental physical phenomenon of the whole universe, most regions containing more of it than visible light and heat. Our bodies are traversed by it night and day . . . it breaks up several million atoms



Keystone

GEORGES CLAUDE AND THE MILE-LONG PIPE THROUGH WHICH HE CONDUCTS THE COLD WATER FROM THE BOTTOM OF MATANZAS BAY TO HIS EXPERIMENTAL BOILER-TURBINE. ENGINEERS POINT OUT THAT THE POWER REQUIRED TO PUMP UP THE COLD WATER MAY ALMOST EQUAL THE POWER GENERATED AND THAT THE LOW PRESSURE REQUIRES AN EXCESSIVELY LARGE TURBINE

in each of our bodies every second. It may be essential to our life or it may be killing us."

Neon + Mercury Arc

ALTHOUGH much has been written of the neon light, public knowledge of the use of neon gas for electrical illumination centers around its application to advertising signs, the weird red glow of which catches or repels the eye according to the æsthetic discrimination of the individual.

Recently a young engineer in New York announced the development of a neon lamp which he claimed could be used for general illumination. Description of this lamp included the statement that it can be operated without the use of expensive auxiliary equipment such as transformers and devices to start the gaseous discharge in the neon tube, making it suitable for new uses to which the older type lamps are ill-adapted. As a matter of fact, (it is hoped the young engineer knows it) there are, and have been for several years, a number of neon lamps that can be used on ordinary lighting circuits without the use of transformers.

In what degree the new lamp differs from those already on the market is not of such great concern as is their use for purposes of general illumination. The neon lamp, whose light is characteristically red, has many valuable scientific and industrial uses, but as a source of general illumination, particularly in the home, it is far from satisfactory.

The fact that the neon discharge produces a red light means that the apparent color of nearly everything it illuminates is distorted or changed. Nor is it pleasant to work under such a light, for its red glow is irritating and in some cases causes headache and restlessness.

Laboratory workers, recognizing that the neon light is a step toward the goal of colder light, yet keenly aware of its present disadvantages, have long been working on the problem of finding some method of adapting it for wider use in illumination. The mercury vapor arc light which is blue-green and knows not the red region of the spectrum likewise does not reveal all objects in their true colors. Attempts have been made, but so far without much success, to combine the desirable characteristics of both sources of light in a perfectly satisfactory lamp.

In this age of magnificent accomplishment in research it is unwise to say what cannot be done, but for the moment, at least, the neon lamp is not satisfactory as a source of general illumination. Its industrial uses, however, are far-reaching and very important, for it is the glow of the neon gas in tiny lamps that is playing such an important part in the development of television. A more recent use has been found by those exponents of capital letters, the Motion Picture Engineers, who are now using neon light in combination with that of mercury vapor arcs for new effects in cinematography. The addition of certain quantities of the neon red brings new possibilities for color values on the screen, and no doubt will be used to full advantage in this new field.

River Taming

A SILVER spike, driven to begin a railroad spur from Las Vegas, Nev., to the Colorado River, has initiated construction of the Boulder Dam in Black Canyon — the climax of eight years of negotiations, tectonic probes, and political deviations. Simultaneously comes the announcement that the project is to bear the name of President Hoover who, as Secretary of Commerce, did much to get the project started.

That this Hoover Dam is to be 550 feet high and that it will, with its attendant features, cost about $165,000,000 are facts generally known. A clearer conception of the magnitude of the undertaking can be obtained by these additional statements: there are 7,000,000 acres of land in the Colorado Basin at a proper level with respect to the river to be possible of irrigation; the dam will impound enough water to blanket Massachusetts with a layer five feet deep; as much power as is now used in California or in Illinois, including Chicago, will be generated. The flood control features in themselves are sufficient to intrigue the imagination of the Southwest, for the Imperial Valley has not forgotten the break of 1905 when the Colorado went haywire and revised the Salton Sink into the Salton Sea. Nor does the Southern Pacific fail to recall the $2,000,000 it spent on levees to prevent a blockade of its route.

Building the Hoover Dam, therefore, promises to be a story as interest-provoking as the digging of the Panama Canal, and The Review purposes, from time to time, to

report upon the progress made against natural handicaps. The site is in the "great American desert" of the 1840's, the period when the Senate was pinching pennies to revise Gadsden's treaty and move the international boundary 100 miles north of the mouth of the Colorado to a point near Yuma, Ariz., long conceded the hottest town in the United States with the possible exception of its more northerly rival, Needles, Calif.

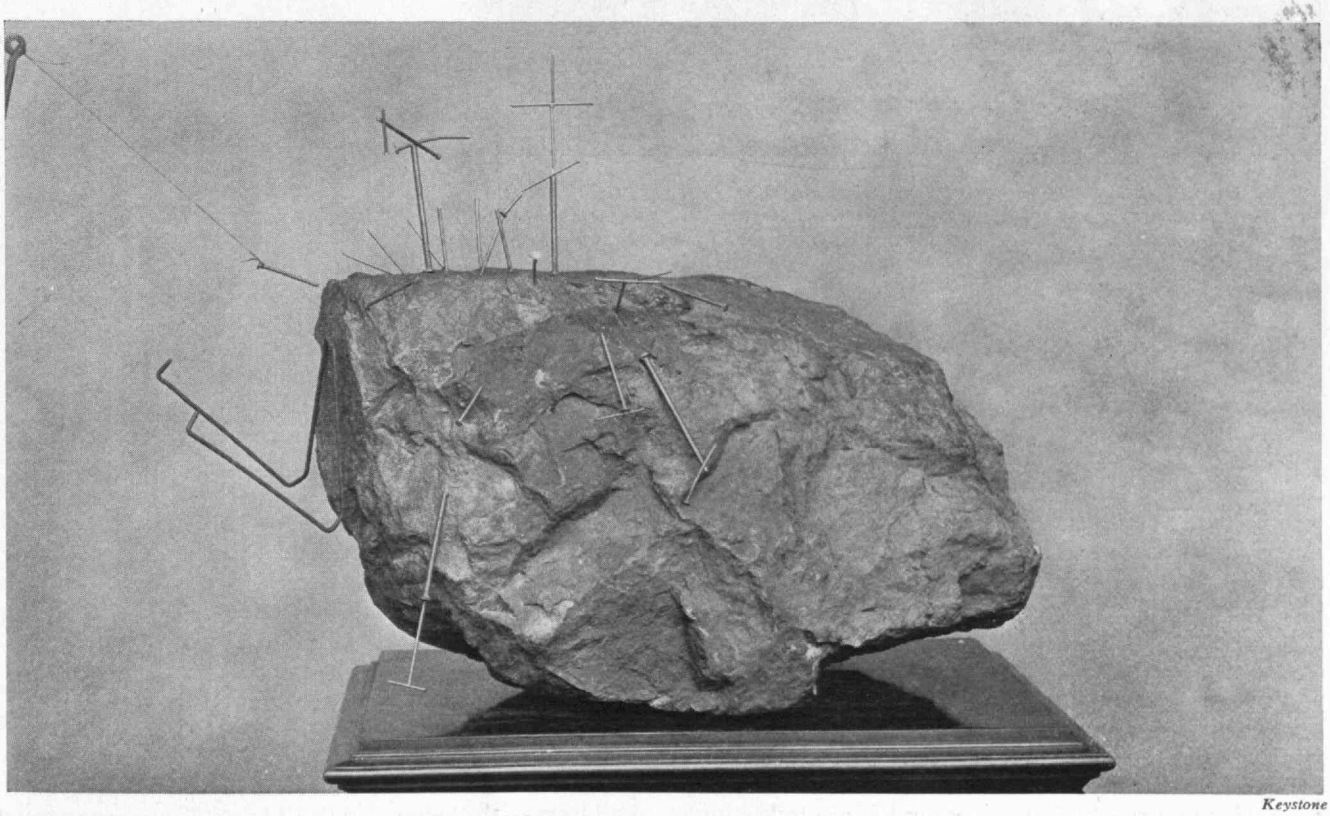
Already, in selecting a town site to house the horde of construction men working on the dam, climatic conditions have given trouble. Originally it was to be three miles from the river and 800 feet above it. In midsummer, however, test thermometers there registered 115°, so the location was removed three miles farther back to a spot 600 feet higher where thermometers registered but 108°. It is expected, fortunately, that artesian wells will make it unnecessary to pump water from the river to care for the 5,000 expected population of the new village, for which Nevada's two Senators have sought permission from the Federal Radio Commission to establish a broadcasting station.

Though puny in comparison with Hoover Dam, the completion of two similar projects this autumn and the announcement of a third have attracted notice. The finished dams are at Fifteen Miles Falls on the Connecticut River between St. Johnsbury, Vt., and Littleton, N. H., and at Conklingville, N. Y. The former is an earth dam, anchored with the largest retaining wall in the country and its hydroelectric plant, the largest in New England, is to develop about one-quarter of the amount expected from Hoover Dam; the latter is part of a system of barriers to regulate the Hudson. This flood control scheme is described in Mr. Sargent's article on Page 70. The third dam, announced last month, is to be erected by the West Kootenay Power and Light Company near the confluence of the Pend Oreille River with the Columbia. It will impound the entire flow of the Pend Oreille back to the British Columbia-U. S. border and will be 400 feet high.

Heat from the Stars

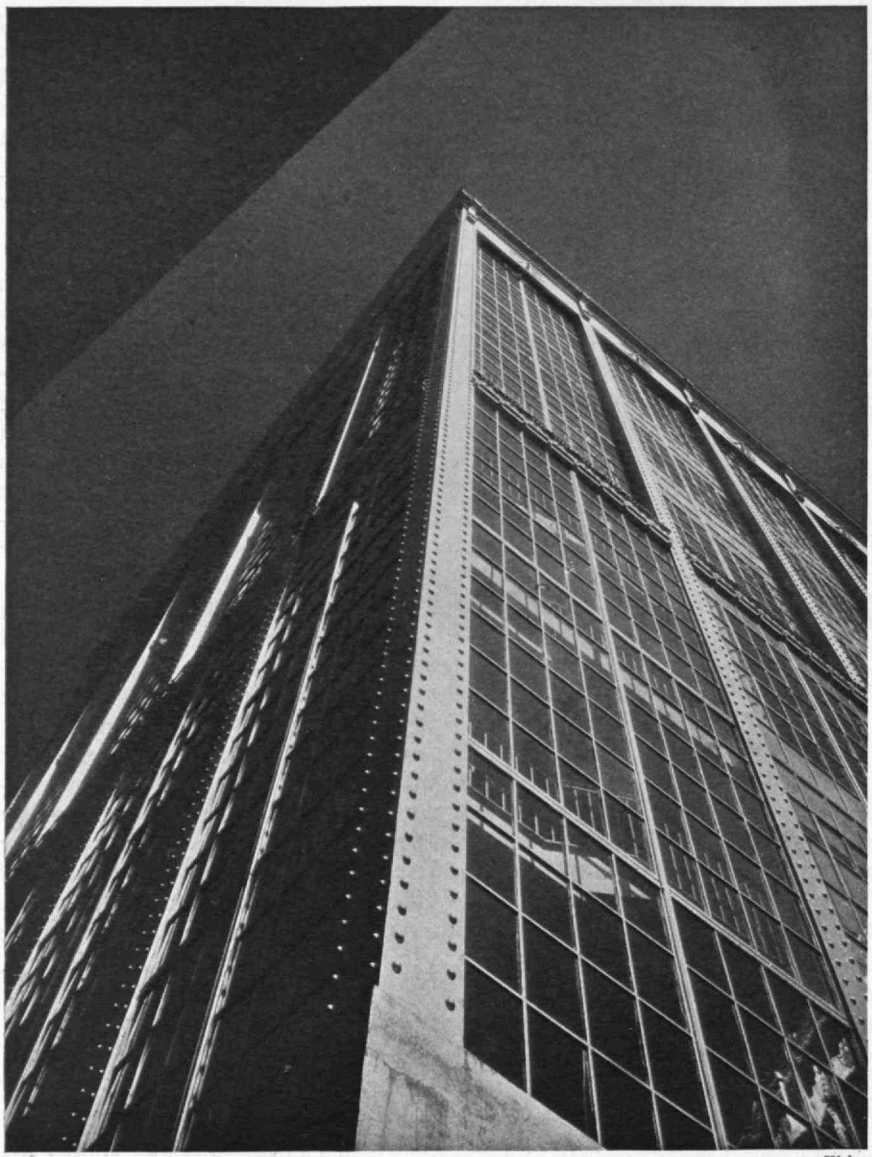
ON APRIL 29, 1924, Ernest Fox Nichols, the first to measure successfully the heat of the stars, delivered a paper on that subject before the National Academy of Sciences in Washington. Just as he concluded its presentation he quietly sank to the platform and died, the second President of the Institute to die speaking in the interest of science. Not only did he measure the heat radiation of a star, but he devised and perfected the radiometer which Charles G. Abbot, '94, Secretary of the Smithsonian Institution, has used so successfully in measuring the energy curves of stella spectra.

In defiance of a mortal disease, Dr. Nichols worked doggedly and fruitfully in this field of astrophysical research and succeeded in pointing the way toward measuring the diameter of stars and determining their life history by means of enormously delicate heat-measuring instruments. The story of his courageous career lies behind the perfection of a new thermocouple for measuring stella heat which was announced by the Carnegie Institution on September 20. This instrument, consisting of two hair-like wires, one of bismuth and the other of bismuth and tin welded together at the ends, will indicate a change in temperature of one-millionth of a degree Fahrenheit.



Keystone

NATURAL MAGNET OR LODESTONE, WEIGHING 400 POUNDS, NOW ON EXHIBITION IN THE FIELD MUSEUM OF NATURAL HISTORY, CHICAGO. IT WAS FOUND IN UTAH



Weber

STEEL AND GLASS CARRIED TO THE ULTIMATE IN BUILDING CONSTRUCTION. ADMINISTRATIVE BUILDING OF THE WORCESTER PRESSED STEEL COMPANY, DESIGNED BY J. D. LELAND AND COMPANY, BOSTON. ALL EXTERIOR DECORATIVE ELEMENTS ARE EXECUTED IN GLEAMING METAL, AND THE BUILDING'S SURFACES ARE PAINTED WITH SHINING ALUMINUM-BRONZE PAINT. SEE OPPOSITE PAGE

The thermocouple is placed in a telescope so that only the rays of the star to be measured fall upon the wires. The heat of the star creates a measurable current in the wires in the order of one twenty-billionth of an ampere.

Two days before the announcement of this instrument, engineers of the General Electric Company described a new vacuum tube which, used conjunctively with photo-electric cells, can measure a current, generated by star radiation, of one hundred-quadrillionth of an ampere.

At the Washburn Observatory in Madison, Wis., work is under way to adapt this new device to the 200-inch telescope for which Elihu Thomson is constructing a mirror of fused quartz in Lynn, Mass.

So do the powerful resources of modern physics steadily furnish means of peering into the mysteries of the universe. By means of them, as George Ellery Hale, '90, has said, the astrophysicist, pushing his researches into space, "exhibits conditions of temperature and pressure often transcending those attainable on earth, and thus presents for observation experiments on an immense scale, the interpretation of which has already added much to our knowledge of physics and chemistry."

The Home To Be

SECRETARY LAMONT of the Department of Commerce says that $50,000,000,000 will be spent on new residential construction in this country in the next 20 years, and $500,000,000 a year during the same period on maintenance and repairs of houses. Our building business ranks next to agriculture — every day it must care for 7,000 more people than the day previous — and, though skyscrapers receive the emphasis of public attention, especially when flagpoles vie with mooring masts for topmost records, the outgo for homes, even if Mr. Lamont be a couple of millions or so off in his estimates, is startling. By comparison, the quartet of towers (Empire State, Salmon, Squibb, and New York Trust) now adding 192 stories to New York's skyline represent an investment of $100,000,000, and not since 1924 has such a huge building program been undertaken on Fifth Avenue.

Yet it has been truly stated that, from the viewpoint of financing and modern mass production, American house building is still in the dark ages. President Hoover has pointed out that it is easier to finance the purchase of a short-lived automobile than to finance the purchase of a permanent home, and all students of building construction know how much is wasted once a house is financed. Instances of "minds at work on new structural systems or methods as applied to minor buildings" do exist, however, and the research of a Technology graduate who has carried out in actual construction new ideas based on a cube as a *structural module*, is described in the September issue of *The Industrial Bulletin* of Arthur D. Little, Inc.

Turning, however, to the discoveries of new materials and of new ways to use hitherto existing materials, the record is more abundant. Capital will not be available any longer for the shoddy construction now found in the "new slums" of too many suburban districts, in the opinion of Truman S. Morgan, President of the F. W. Dodge Corporation. Furthermore, with the availability of cheaper and better materials, Harry E. Freund, Director of the American Research Foundations, goes so far as to predict that tenements, and even skyscraper apartment buildings of the better class, will begin disappearing from American cities in the next ten years. While this as a dic-

tum might be open to question, Mr. Freund is supported by the fact that almost every American metropolitan center is showing highest population gains in outlying residential sections.

Wood, commonest of materials in housebuilding, has succumbed to the machine-age. It can now be treated and made more flame-proof than costlier materials; it is being supplied ready-cut in standard sizes direct from the lumber company to the job; it is being ground up and pressed out to make wall boarding, or shredded and sprayed with chemicals and puffed up to become insulating material to cut down heating bills. At this writing, intelligence of a new "metal wood" comes from the Kaiser Wilhelm Institute at Düsseldorf. It is a compound consisting, the report says, of "wood which has been blended with low fusing point metals, such as lead, tin, or alloys, while still retaining its structure" and "its power of swelling and its combustibility are very small."

Materials in small units are undergoing the attack of heavy labor charges: shingled roofs of wood, slate, or asbestos face the competition of durable sheet metal of pleasing appearance, and of large thin composition or terra cotta slabs; floors made of small boards are proving no more worthy than single plastic slabs; the traditional three coats of plaster neither look nor wear better than wall board. Non-corrodible chrome steel, aerocrete (mentioned in the October Review), arc welding, and countless other new materials and processes are being seized upon eagerly by the builders of the larger buildings and may soon be employed commonly in residences.

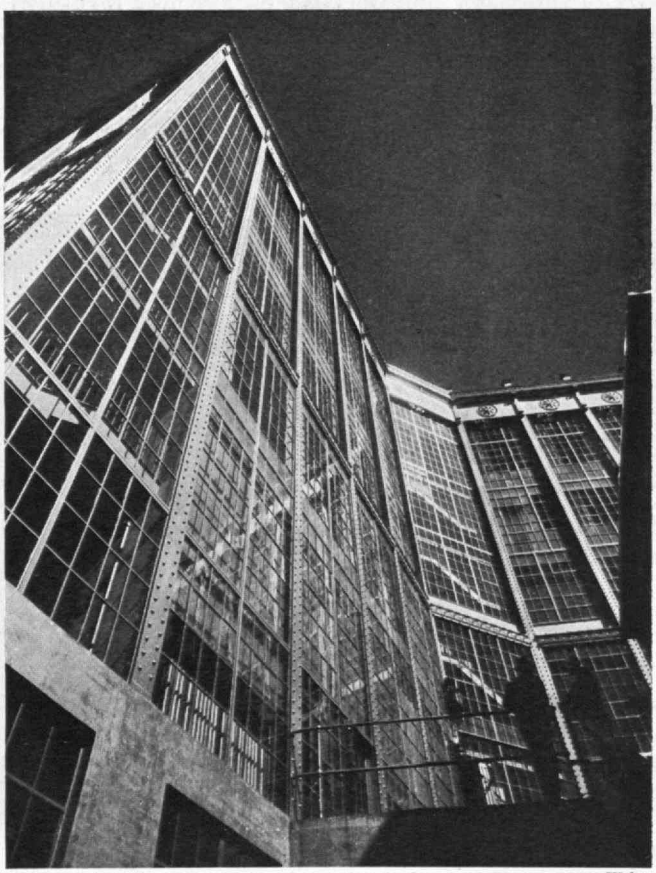
Already the skyscraper of today bears little resemblance, either in its architectural design or construction, to that of 1920, and what has been happening to it may point the way to a different sort of smaller building. Tradition, as it should, counts heavily where the home is concerned and there need be little fear of a utilitarian box period. But the avidity with which the American people have accepted plumbing, central heating, gas and electricity, and the horde of mechanical gadgets which followed, indicates a readiness to adopt the new if its claim appear reasonable.

It would thus appear certain that the American home is due to enter upon an era of change from which it may issue with a much altered conception of its design. Possibly the era will be as momentous — and let us hope fervently, as gratifying — as that which saw the overthrow of Victorian Gothic, mansard roofs, oriels, porte-cochères, and the other symptoms of the architectural colic of the Parvenu Period, the Reign of Terror of the 1870's and 1880's.

Tribulations of a Merchant Marine

GOVERNOR John Winthrop in the 1630's launched at Boston, the 30-ton sloop *Blessing of the Bay*, America's first contribution to ship building, and by 1700 a thousand vessels were plying out of New England ports. Since that auspicious beginning, the American Merchant Marine has had many ups and downs. Of the ups may be mentioned: the growth of the whaling industry centering





Weber

A SYSTEM OF LEAD JOINTS HAVE BEEN DEVISED SO THAT THE CONTRACTION AND EXPANSION OF THE STEEL WORK WILL NOT CRUSH THE GLASS WALLS. THE ENTRANCE DOORS AND ARCHITRAVES ARE WROUGHT FROM STAINLESS STEEL

in Nantucket and New Bedford; Nathaniel Bowditch's preparation of "The American Practical Navigator," containing the first workable system of navigation; his record-breaking trips to the Far East in the *Astrea* and *Putnam;* the resulting developments of the golden age of the clipper ship; the building and sailing of the Baltimore privateers in the War of 1812; the creation of the *Savannah* which crossed the Atlantic partly by steam power in 1819; the operation of the Black Ball line, the first to run on regular schedules.

The reverse of the picture is represented by conditions after the Revolution when Congress was obliged to invent a subsidy, the Hamilton tariffs which fixed port dues for American ships only one-third as high as for those under foreign flags; by Jefferson's embargo which in one year shrank our sea-going commerce to a fifth of its previous volume and by his later non-intercourse acts against the British and French. When recovery from these had been accomplished so that about two-thirds of our commerce was being carried in American bottoms, the Civil War took place. According to Commodore Herbert Hartley, "the history of our merchant service for the next 50 years could be written in a sentence; we had no merchant marine history."

The Great War brought a revival in shipbuilding, and American yards produced the greatest fleet of sea-going vessels ever completed within a comparable period. Created by Congress in 1916, the United States Shipping Board was charged with "encouraging, developing and creating a naval auxiliary and naval reserve and merchant marine . . . ; to regulate carriers engaged in foreign and interstate commerce of the United States. . . ." It found the country had only 61 shipbuilding yards with 234 ways (more than a third of the yards were only equipped to build wooden ships), but at the Armstice it could count 223 yards with a total of 1,099 ways. In 1918 its operating subsidiary, the Emergency Fleet Corporation (changed in 1927 to the Merchant Fleet Corporation) controlled a total fleet of 1,196 vessels of over 6,500,000 tons.

In 1920 Congress decided it would be the policy of the United States to have an adequate peace-time merchant marine and assigned responsibility for its development to the Shipping Board without giving particular instructions as to how the end should be accomplished. Against heavy odds the Board resolutely tackled the seemingly impossible task and now, at the close of a ten-year period, can point with pride to a record of accomplishment during which the center of gravity has been shifted from public to private ownership.

At first it undertook to determine what services were actually needed and determined upon 77 trade routes, later consolidated to 38. These did not include existing private lines under American registry or tramp services, nor was it supposed that the system of lines laid out by the Board would be final. "It was adapted to the needs of the country as the Board saw them at the time," says Chairman T. V. O'Connor, and the policy "was not to have American vessels monopolize American overseas trade, but to build up a permanent fleet that would be capable of transporting more than half of our foreign commerce."

Private operation was the goal but this was to be a long process and at first the best that could be done was to get private companies to act as operating agents for the Board which retained the risks. Ships were then offered at a very attractive prices and after five years this scheme was working well. It was clear, however, that United States shipping was at a severe disadvantage due to low foreign construction and operating costs.

This condition was effectively remedied in 1928 by the passage of the Jones-White Law under which an American builder can borrow three quarters of the capital cost of his ship at the same rate of interest as is paid by the Government, and the loan period may extend over 20 years. The act also makes it much easier for the Shipping Board to sell its vessels to private owners and provides a means to bring about the ultimate elimination of the Government as an operating factor.

By allowing mail contracts to be made for ten-year periods, and by authorizing a higher rate of pay for carrying mail, an inducement is offered to compensate for the higher construction costs and the higher expense of operation as compared with vessels under foreign registry. Now, too, the holder of a mail contract can know better where he stands for he will not have to face annually the possible non-renewal of one of his important sources of revenue. Moreover, the rate per pound per mile is based on a sliding scale depending on the ship's speed, and a 20-knot express steamer will get over five times the rate given a 10-knot boat. Thus an owner can afford to undertake the greater risks attendant upon building swifter vessels as well as their increased operating costs.

Under the terms of mail contracts about 70 new ships are to be constructed during the next eight years. The best immediate

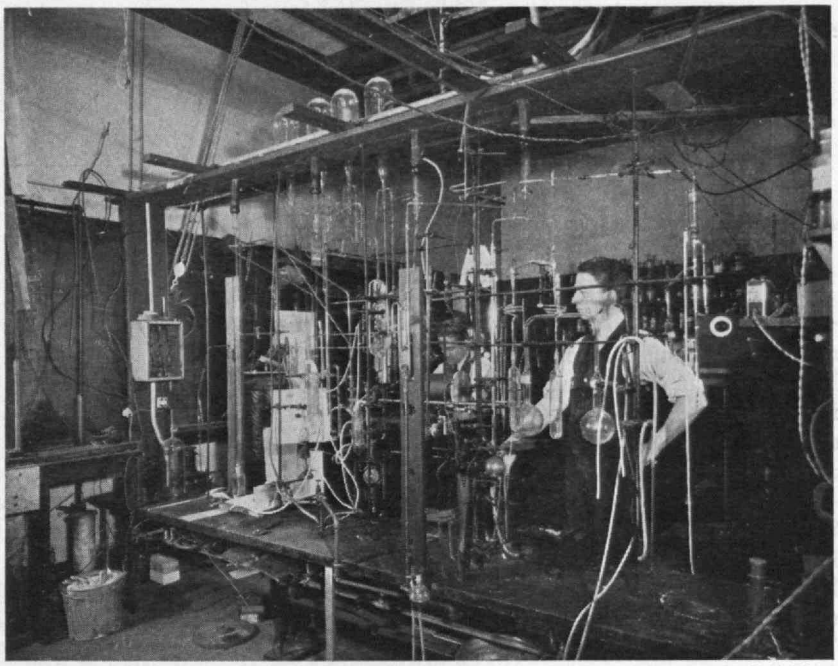


M. I. T. Photo

IN THE INSTITUTE'S RIVER HYDRAULIC LABORATORY: UTILIZING THE PRINCIPLE OF SIMILITUDE TO ASCERTAIN FROM A MODEL THE PROPERTIES OF A DAM SPILLWAY. THE PLUME OF WATER IN ACTUAL SIZE WOULD BE 40 FEET HIGH

examples are to be found in the $13,000,000 program for three "AGWI" liners: the *Morro Castle* commissioned last August, the *Oriente* to be commissioned next month, and the *Borinquen* to become in January the flagship of the New York and Porto Rico S.S. Company, or the four prospective $5,000,000 vessels of the Panama Mail S.S. Company.

Expressed in figures the good result of the Jones-White act is demonstrated by the fact that the Board is now operating 17 routes of 96, the remaining 79 are being operated by 25 private companies; 151 vessels have been sold to private operators since January, 1929; the cost of the Board and the Merchant Fleet Corporation to the Government in fiscal 1931 will be half what it was in fiscal 1929. In round numbers there are now 700 ships, representing an increase in tonnage of 550% over 1914.



M. I. T. Photo

IN THE INSTITUTE'S RESEARCH LABORATORY OF PHYSICAL CHEMISTRY: APPARATUS USED IN OBTAINING VERY PURE WATER, ENTIRELY FREE FROM DISSOLVED GASSES. THE PURIFIED WATER IS UTILIZED IN DETERMINING THE PROPERTIES OF STEAM AT HIGH PRESSURES. SEE OCTOBER REVIEW, PAGE 18

Higher and Longer: Being the Account of a Pipe-Dream and a Near-Reality

ENGINEERS are now speculating upon the possibility of a Babel-like structure 5,280 feet high which will exceed five times the height of the Eiffel Tower. Before the New York Section of the American Welding Society, Gilbert D. Fish, a consulting engineer for Westinghouse, told his colleagues that it would be practicable to build such a structure.

The proposed mile-high tower would be 528 feet square at the base, and it would take 19,000 tons of steel for the entire construction. This does not include any allowance for landing stages, observation galleries, elevator hatch framing, and other framing which would be needed to make the tower useful; the weight of these extras and the additional material in the main tower to carry the added load might bring the total to 25,000 tons.

For the sake of comparison, it is interesting to note here the heights of two famous New York buildings: The Empire State Building with its dirigible mooring mast is to be 1,248 feet; and the Chrysler building is 1,046 feet to the top of the spire. Although the design of the speculated mile-high tower calls for only 25,000 tons of steel, the Empire State Building required more than 46,000 tons, indicating how everything is sacrificed to height in this pipe-dream tower.

Although Mr. Fish did not indicate what use could be made of this huge steel needle, such a tower, or even taller ones might be erected for scientific purposes, for service in connection with aviation, for advertising, or for public amusement. It is evident that a tower lacking solid walls and solid floors can be built far higher than any other building structure, although at present no figures have been computed limiting heights as governed by strength and weight of available materials.

While the mile-high tower is but yet a speculation, the plans for the longest bridge in the world which will span the Golden Gate of San Francisco, are to become a reality. The Golden Gate Bridge will be started next spring and finished in 1935, providing a bond issue to furnish funds is authorized in the November California elections. It will have a single span 4,200 feet long, exceeding by 700 feet the present world's record suspension bridge across the Hudson River in New York, which is now being finished. Scientists have made use of synthetic earthquakes, which are manufactured at the Stanford University Engineering School, in planning this 4,200 feet Golden Gate Span.

It is estimated that several millions of dollars will be saved in the construction of this bridge by using what is known as the deflection theory. This theory maintains that the gigantic cable, the steel members holding the floor of the bridge, and the stiffening steel that makes the bridge rigid all act as one elastic structure. Because of this engineers find that parts of the bridge do not need to be designed for such large tensions and compressions as would be the case under the older theory. This allows a lightening of steel, and thus a saving of money. Professor Charles Derlett, Jr., who is one of the designers, claims that if the Golden Gate Bridge were constructed according to the old theory, it would cost $3,000,000 or $4,000,000 more than the estimated cost of $33,000,000.

Hot Spot

THE highest temperature ever produced on earth, estimated at 900,000°, has been roughly measured by R. Tanberg, of the Westinghouse Electric and Manufacturing Company's research laboratories. This was found on a small spot on the crater of the metallic electrodes between which an electric arc was maintained inside a special type of vacuum tube. Previously the hottest known spot was on the crater of an ordinary arc light which reached 10,000°.

Pounds, Shillings, Pence

AN EXPOSITION of Technology's fiscal 1930, which ended June 30 last, is to be found in the 64-page document presented to the Corporation last month as the annual Report of the Treasurer by Everett Morss, '85. It shows that the Institute's net operating income exceeded the $2,000,000 mark for the fifth consecutive year and was less than $400 short of being two and three-quarters millions.

Capital gifts during the fiscal year amounted to $589,439.16 and included: for student aid, $100,000 from Professor and Mrs. William Emerson and $141,845 from the estate of James H. Haste, '96; for dormitories, $50,000 from Charles Hayden, '90, and a like amount from the estate of Charles W. Goodale, '75. Miscellaneous gifts totaled $63,808.46.

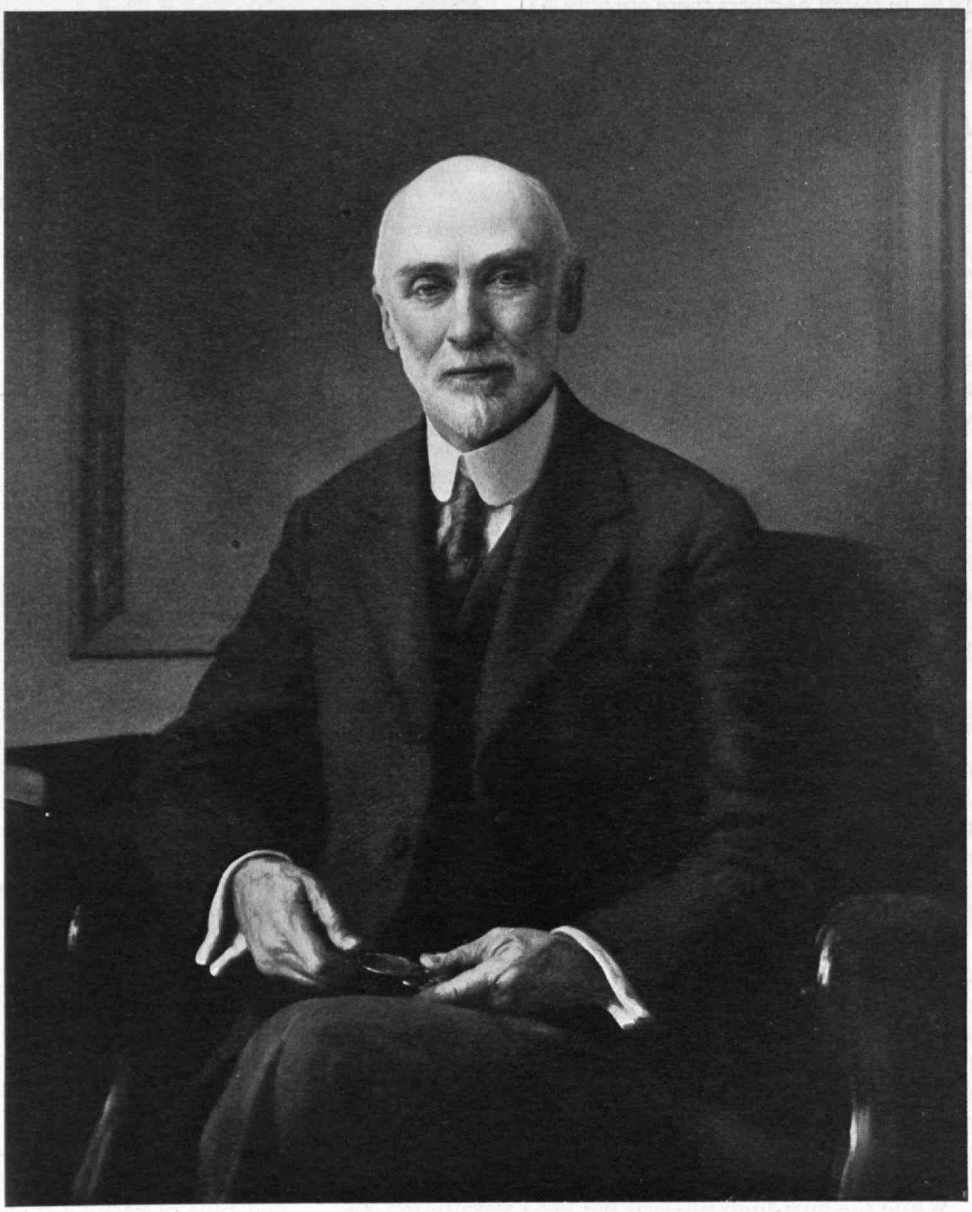
Gross expense for the year exceeded gross income by $390,107 and net expense exceeded net income by $23,059, leaving the current surplus shown on the Treasurer's balance sheet as $22,395. Income from students was $1,267,869, or $92,000 more than in fiscal 1929. Of this increase, $17,300 came from the greater return of the 1929 Summer Session as compared with that of 1928.

Net operating expense during fiscal 1930 was at the rate of $7,600 per day (not including $3,100 per day for research and special payments) as against $7,150, $6,300, $6,200, $6,000, and $5,444 in the five previous years. Academic expenses increased $85,763 or 5.5% over fiscal 1929; administration costs increased $45,859 or 16.6% ($23,160 being due to Inauguration, receptions and extraordinary charges): plant operation and maintenance increased $9,594 or 2.3%; miscellaneous expenses increased $12,431 or 6.8%.

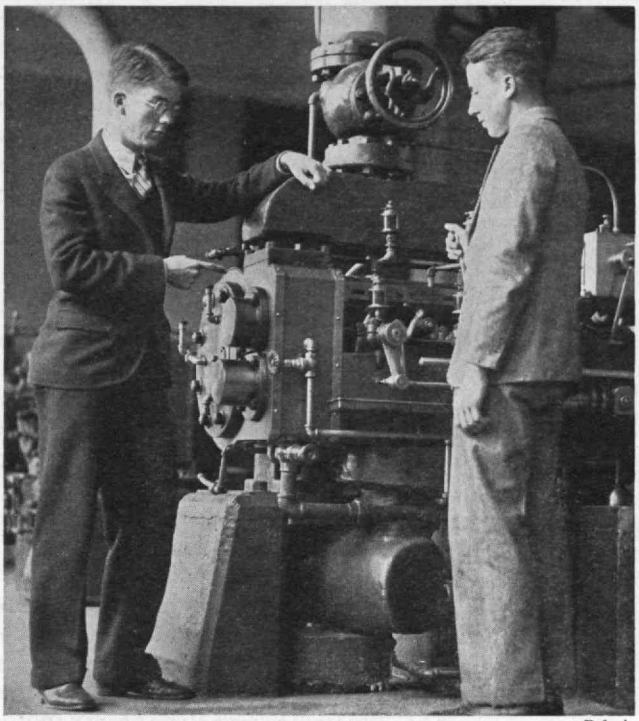
The Institute's total investments, as of June 30, 1930, had a book value of $33,148,985.38. Due to special circumstances, the Eastman Contract and 10 other funds are separately invested, the remaining 150 other funds (amounting to about two-thirds of the total) are consolidated into a General Investment Account. Concerning this Mr. Morss says:

"For some years we have been building up an Endowment Reserve Fund to protect the securities in the General Investment Account from loss and to insure a uniform income return for the funds participating in this account.

"During the year the Endowment Reserve Fund has been increased about $956,000 by realized profits on the sale of certain securities. The fund was further increased



PORTRAIT OF THE LATE DEAN HENRY P. TALBOT, '85 (1864–1927). THE PAINTING, EXECUTED BY E. POLLAK-OTTENDORFF OF BOSTON, IS TO HAVE ITS FIRST SHOWING IN THE OFFICE OF THE DEAN ON NOVEMBER 20



P. & A.

TWO OF THE EDISON SCHOLARSHIP STUDENTS AT THE INSTITUTE: WILBER B. HUSTON, '33, WINNER IN 1929, AND ARTHUR O. WILLIAMS, '34, WINNER IN 1930. TWO OTHERS OF THE 1929 CONTESTANTS, RATED SECOND AND THIRD BY EDISON AND HIS COMMITTEE, ARE ALSO STUDYING AT TECHNOLOGY

by $1,740,000 by marking up certain securities from their original cost part way toward the present market. From the Endowment Reserve Fund as it then stood, a distribution of $2,680,000 has been made to all the participating funds in the General Reserve Account, thereby increasing their principal value about 15 per cent.

"As a result we shall have a somewhat lower net yield on the principal of our investments, but it will permit us to add other funds to the General Investment Account without injustice to the older funds in the same account."

Comparison of the Treasurer's Reports for fiscal 1930 and fiscal 1920 develops many contrasts. The Institute's registration was practically the same for each of the years covered, being 3,078 for 1919–20 and 3,066 for 1929–30, the rise to the high point of 3,505 having come during 1921–22. But, in fiscal 1920 52% of the Institute's total net income derived from students, in fiscal 1930 46%; salaries to teachers in 1920 constituted 38% of net outgo, in 1930 44%; of the income from students during fiscal 1920 only 75% went for salaries to teachers, while in 1930 96% was used for that purpose.

Other changes during the decade are shown below:

(000's and cents omitted)

	Fiscal 1920	*Fiscal 1930*	*% Increase*
Income			
From students	$771	$1,267	64
From Investments	525	1,702	224
Expense			
Salaries of teachers	588	1,317	124
Total academic expense	679	1,613	137
Administration costs	252	321	27
Plant operation and maintenance	329	426	29
Capital			
Book value Educational Plant	$10,792	$14,009	29
Total Funds	14,914	33,148	122

Postlude on Registration

REGISTRAR MacKinnon's predictions announced in the October Review were that a rise of 8% in entering freshmen would be obtained for 1930–31 and that the Institute's total registration this year would exceed the 1929–30 figure by 4%. As of October 1 (the third day of the present term), there actually were 35 more freshmen enrolled (5% increase) and in all 3,187 students (4.9% more than last year). This total registration figure maintains a steady increase which has been noted each year since the post-war low point of 2,671 in 1926–27. With two exceptions (1920–21, 3,436; and 1921–22, 3,505) it has never been exceeded.

This year freshmen number 737, up 35 from last year; sophomores 667, up 23; juniors 599, down 15; seniors 614, up 38; graduate students 512, up 95; unclassified students 58, down 26.

Seven departments have more than 200 students: Electrical Engineering (Courses VI, VI-A, VI-C) 521, up 39 from 1929–30; Chemical Engineering (Courses X, X-A, X-B) 403, up 20; Mechanical Engineering (Course II) 362, up 61; Engineering Administration (Course XV) 346, up 48; Architecture and Architectural Engineering (Courses IV, IV-A) 271, down 24; Civil and Sanitary Engineering (Courses I, I-A, XI) 244, down 7; and Aeronautical Engineering (Course XVI) 232, down 46.

Photographic Service

FROM humble beginnings in a corner of a laboratory there has grown up in Technology a thoroughly equipped and highly efficient Photographic Service which meets the Institute's need for photography in its various forms, from photomicrography to formal portraiture.

The laboratory was designed for straight line production and no single operator need move more than eight feet to carry on his work in any of the rooms of the laboratory.

The lighting system includes every type of light from diffused flood lighting to spot lights and controlled natural light. The various operating rooms of the service are separated by light locks, which does away with the necessity for doors and eliminates the danger of destroying work in process of development. Between the developing room and the printing laboratory is a specially designed drying chamber where a current of electrically warmed air is employed to dry films and plates. The time for this process has been reduced from six to eight hours by old methods, to 45 minutes in the drying chamber. Various types of printing machines are used, and the washing equipment has a capacity of more than 500 prints at one operation. Rotary and cabinet print drying equipment brings the work to the final stage of finishing at a point that places it within reach of the delivery desk.

Examples of the work of this Service may be seen frequently in the pages of The Review. Already there are thousands of negatives on file and the service has become as indispensable as the Photostat and Blueprint services.

THE WASHINGTON NOBODY KNOWS

(*Continued from page 81*)

Washington channel is also the yacht harbor of the District. The United States owns all of this frontage and, with the proposed improvement for well designed piers and bulkheads, there will have been provided "a water front at the seat of government worthy of the dignity and prestige of the nation."

The lone aqueduct which, since 1863, had brought water from Great Falls in the upper Potomac to the capital had been carefully guarded during the war lest its destruction by the act of an enemy bring disaster. Washington was using its capacity flow and suddenly awakened to the narrow escape it had had. Another conduit of greater capacity was planned and built and a filter plant and pumping station constructed, which more than doubled the available supply of pure water.

The old conduit built into one of the famous aqueduct bridges of the world, the Cabin John Arch, afforded a flow line aqueduct from intake to outlet. The most striking feature of the new waterline is the crossing of Cabin John Creek by a reinforced concrete siphon of circular section, with an inside diameter of nine feet, which conforms closely to the natural surface and leaves the historic bridge untouched and the view of its graceful arch unobstructed.

Over the old and new aqueducts, which lie side by side in this federal owned strip, is the conduit road, which will be reconstructed as a boulevard from Washington to Great Falls in Maryland, affording a most attractive drive with enchanting views of the upper river, the Virginia Palisades and the Great Falls, of which Lord Bryce wrote, "No European city has so noble a cataract in its vicinity as the Great Falls of the Potomac, a magnificent piece of scenery which you will, of course, always preserve."

The most vital of public utilities, sanitation, unseen and unknown by the average citizen, has in the past ten years called for an outlay exceeded by three times that spent in the preceding decade. In the five years just past there has been expended for large mains and pipe sewers in the District of Columbia more than $6,000,000 as compared with two and a quarter million in the five years before. Today there are more than 200 miles of main concrete sewers in Washington.

This increase in expenditures reflects not only a normal growth but also reflects closer coordination of sewer construction with city planning. No street in Washington is now paved or repaved until the necessary sewers are installed, or if required, enlarged or reconstructed. This, as it may readily be seen, eliminates the tearing up of new streets.

The recent impetus given to the creation of new parks and the development of existing parks has had much to do with the change of sewer design from the combined to the independent system. Many streams passing through the district have their source in Maryland, and an agreement made in 1924 created a metropolitan area in which the sewers of Washington are, or will be, utilized as outlets for Maryland sewage, thereby avoiding the pollution of waterways in Rock Creek and other parks of the District so justly famed for their great natural beauty. The question of coordination of park development with sewerage and storm water control is probably given more serious consideration in Washington than elsewhere, as in the personnel of that most valuable adjunct to the National Capital Park and Planning Commission, the "Coordinating Committee," is included a drainage and sewer expert.

Another small factor, but one which makes Washington more livable and which has recently been adopted as a municipal activity, is mosquito control. With some 8,000 storm water catch basins it was discovered that there were 8,000 sources for mosquito breeding, and that each basin contains a stagnant pool in its bottom, nice and dark as though built for the purpose. The spraying of these basins with gas oil once each seven days during the eight warm months of the year does not cost much and does make life more pleasant and healthful.

THE livable qualities of Washington have been wonderfully developed in the last decade. Intelligent planning to fit varied topography has made new residence sections most attractive. While the steam shovel and the axe were not restrained in time to save some beauty spots, many hills and dales beautifully wooded have been reclaimed by skillful landscaping. The Federal Government's building program, which we can merely refer to, is now well under way. It is of such magnitude and beauty as to fully satisfy the thought of President Hoover when he said:

"It is the wish and demand of the American people that our new buildings shall comport with the dignity of the capital of America, that they shall meet modern requirements of utility, that they shall fulfill the standards of taste, that they shall be a lasting inspiration. In architecture it is the spiritual impulse that counts. These buildings should express the ideals and standards of our times; they will be the measure of our skill and taste, by which we shall be judged by our children's children."

Washington's own need for new buildings, exclusive of Federal projects, has required an investment of $420,000,000 in new construction during the last nine years. It is to the city's credit that 41,000 residential and apartment structures have been built since 1920, providing housing for a population equal to that of the cities of Syracuse or New Haven, without interfering with the architectural scheme which is destined to make Washington a truly magnificent capital.

No structures in the downtown section may exceed 110 feet in height on the street front with a maximum height of 130 feet obtained by the use of setbacks. The result has been a wide distribution of business buildings accompanied by a general excellence of architecture.

By what tests shall "livability" be measured? A distinguished American planner suggests, "public health, well-being, and safety, with sunlight and the quality of urban air, with the increase of comfort and beauty, with new opportunities for fun and amusement, and with fitness of cities as an environment for new generations." Washington, in the opinion of one who lived there twelve years, satisfies these tests in a greater degree than any other American city.



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PROMETHEUS ENCHAINED

(*Continued from page 69*)

enormously diminished, the accident rate drastically reduced, and a cleaner, safer, more comfortable, more sightly, more integrated nation have been our heritage.

I speak of the *engineering mind*. This is not to be confused, alas, with the average engineer as we know him. At the beck and call of the business man, the poor fellow can hardly be said to have a mind of his own. He is narrow, near-sighted, over-specialized — even as is his master. He has no more sense of state than a rabbit. But before he was yoked to the treadmill, there may have been moments when he glimpsed the dignity, the responsibility, the supreme challenge of his profession; when for one lucid interval he may have realized that he belonged to the most important group in the modern world; that indeed he had the world in his keeping. A few individuals (I will mention no names) have kept the realization untarnished, and that is what I mean by the engineering mind.

It is a mind that is professional, not commercial; dedicated to building, not to profit-making; that is done with false modesty and has the courage to accept the job of taming the billion wild horses which Watt let loose; that thinks straight and hard; hates waste and confusion, dirt and despair; that never stoops to the shoddy or the adulterated.

Plato once called for philosopher kings. Today the greatest need in all the bewildered world is for philosopher engineers.

HARNESSING THE HUDSON

(*Continued from page 72*)

investigations by the state and the Board. Such a project would have had a total storage capacity of 7.8 billion cubic feet, whereas the dam as now built, with a crest elevation of 771 feet above mean sea level, creates a total capacity of 37.8 billion cubic feet and an available capacity above elevation 740, the low draft elevation, of 30.0 billion cubic feet.

Following the floods of 1902, the Legislature passed Chapter 406 of the Laws of 1902, creating the Water Storage Commission, "to investigate the causes of floods and overflows of river and water courses and make recommendations for preventing the same and making an appropriation therefor."

The Water Storage Commission made an extensive investigation and submitted an elaborate report to the Legislature, stating, "legislation providing for such a system of river regulation is in our opinion a great and urgent public necessity," and recommending the creation of a permanent commission to construct and maintain an adequate system of river improvement in the state. It is interesting to note that their thought,

> "the central idea should be that the entire cost of the execution and maintenance of each of the various separate works comprising such a system should be borne by the beneficiaries in proportion to the benefits they respectively derive from it,"

is written into the present river regulation act in almost that exact language. (*Continued on page 98*)

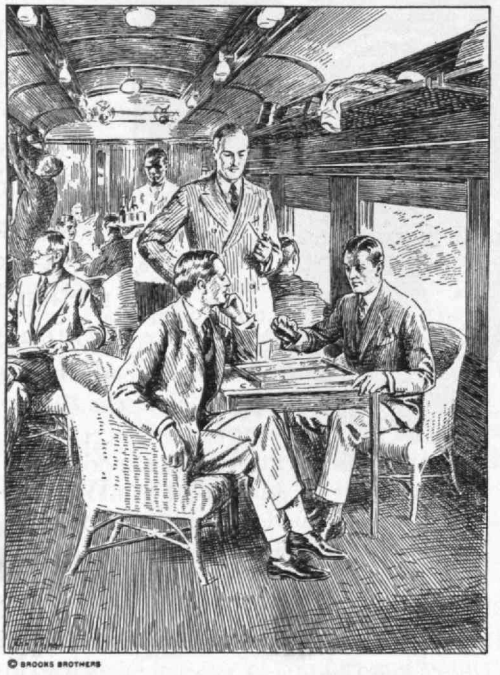
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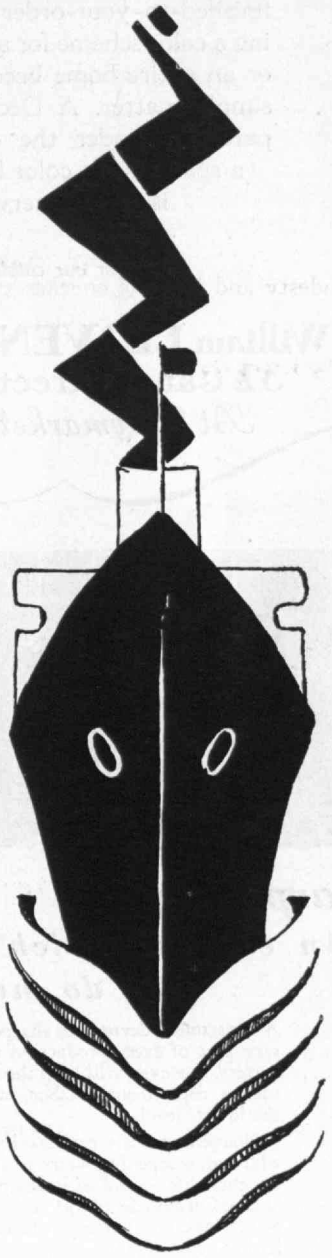
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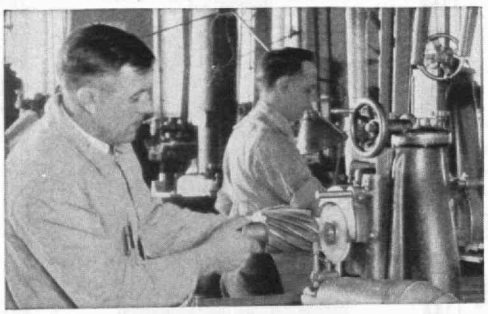


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B·S

HARNESSING THE HUDSON

(Continued from page 96)

Up to 1906 the streams had been studied almost entirely from the viewpoint of navigation and flood prevention. Water power had been considered only as an incidental matter, but the growing interest in the conservation of natural resources, especially of water power, resulted in 1907 in the passage of an act authorizing the State Water Supply Commission to make an investigation of the water power and storage resources of the state. Immediately on the passage of this law the commission began elaborate surveys of the entire Sacandaga Reservoir Basin, and in 1908 a most comprehensive report was prepared by the commission's consulting engineer, John R. Freeman, '76, and submitted by the commission to the Legislature.

The flood in 1913 again focused the attention of the people of the state of New York on the necessity for water storage and during the session of 1915 the Legislature passed the Water Storage Law, chapter 662, of the Laws of 1915, providing for the creation of river regulating districts. In July, 1922, the Water Control Commission of New York received a petition from the City of Glens Falls and others praying that the territory constituting the watershed of the Hudson River and its tributaries within the state above the intersection of the southerly boundary lines of the counties of Albany and Rensselaer with the Hudson River, excepting therefrom the watershed of the Mohawk River, be created into the Hudson River Regulating District. In pursuance to the provisions of Article VII-A of the Conservation Law, hearings were held by the Water Control Commission and in August, 1922, the petition was granted and a final order entered by the commission creating the new district.

Hon. Henry M. Sage, Hon. Erskine C. Rogers, and Hon. Edgar H. Betts were appointed members of the Board of this district and the writer was appointed Chief Engineer.

The first duty of a regulating district is to prepare a general plan for the regulation of the flow of the streams in the watershed. Accordingly, a general plan for the regulation of the flow of the Hudson River was prepared which calls for the eventual construction of sixteen storage reservoirs on the Hudson, Sacandaga, Schroon, Indian, and Cedar Rivers and other tributaries, having a total capacity of 80 billion cubic feet and estimated cost of over $30,000,000.

The general plan was certified to the Water Control Commission and approved by it with certain modifications in June, 1923, and under the law became the official plan regulation of the Hudson River flow and certain of its tributaries. As has been noted, this plan included the Sacandaga Reservoir and the Board in pursuance of the provisions of Section 450 of the River Regulating Act prepared the Preliminary Plans of the reservoir, which would be created by a dam about 100 feet high at Conklingville, Saratoga County. These maps, plans, and specifications were adopted by the Board in January, 1924, and approved with slight modification by the Water Control Commission.

The Board's next step was to make the apportionment of the cost of the reservoir and, after *(Continued on page 100)*

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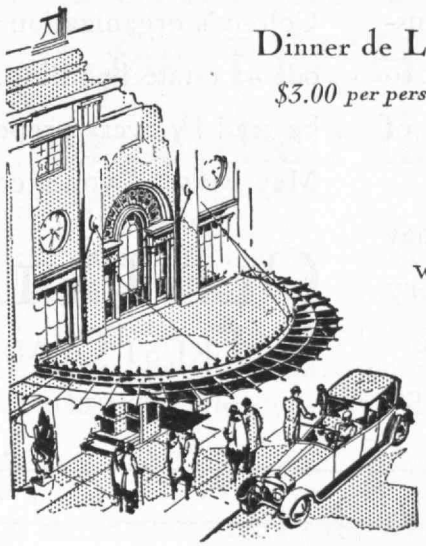
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WALTON H. MARSHALL
Manager

HARNESSING THE HUDSON

(*Continued from page 98*)

a great deal of study by the engineering staff, the Board adopted in January, 1925, the apportionment of cost which provided that the cost of the Sacandaga Reservoir should be apportioned among the beneficiaries in proportion to the benefits inuring to them.

The largest of the reservoirs is the Sacandaga, with a total capacity of 38 billion cubic feet (875,000 acre feet), but to prevent unsanitary or unsightly conditions in case of too great a depletion, the last 40 feet of storage will not be drawn but permanently impounded so that the available storage is 30 billion cubic feet.

The Sacandaga Reservoir, costing approximately $12,000,000, has been created on a large scale with an area of 42.3 square miles, almost identical with the area of Lake George. It is nearly 30 miles long and six miles wide at its widest section. The watershed at Conklingville is 1,040 square miles, and its storage capacity will nearly completely control the flow of the river. The capacity was decided upon after elaborate topographic surveys of the reservoir had been made and area and capacity curves drawn. A stream gaging station just below the dam site, which was established in 1907, furnished the data necessary for the mass curve studies. The next step was to make estimates of the cost of the reservoir for various elevations and these data, with the stream flow records and the capacity curve, made it possible to determine the economic limit of storage. Fortunately, in this case, it was found possible to impound practically all the flow available in an average year. Diamond drill and other borings were made to reveal the geological conditions at the dam site so that a determination might be reached as to the proper type of dam to be built. It was found that there existed at Conklingville a pre-glacial gorge over 200 feet deep, which precluded the construction of a masonry dam, so it was decided to build an earth dam of the modified hydraulic fill type. Fortunately, rock of the granitic gneissic type existed on the north side of the dam site, making it feasible to construct a concrete spillway for the discharge of any excess flow. This 400-foot spillway (there being also incorporated in the outlet structure the largest siphon spillway yet built) has a capacity for a flow 50% greater than the 1913 flood, even assuming the reservoir full at the inception of the flood. This is an extremely remote possibility, but the volume of storage impounded in the Sacandaga Reservoir is so great that a large factor of safety is advisable.

The construction of the reservoir required other work than the construction of the Conklingville Dam. In fact, 17 separate contracts have been awarded with one minor job now under preparation. First, it was required to construct new highways around the shores of the reservoir, totalling nearly 40 miles of gravel roads and about five miles of state highway relocation. There were over 12,000 acres of timber lands (*Concluded on page 102*)



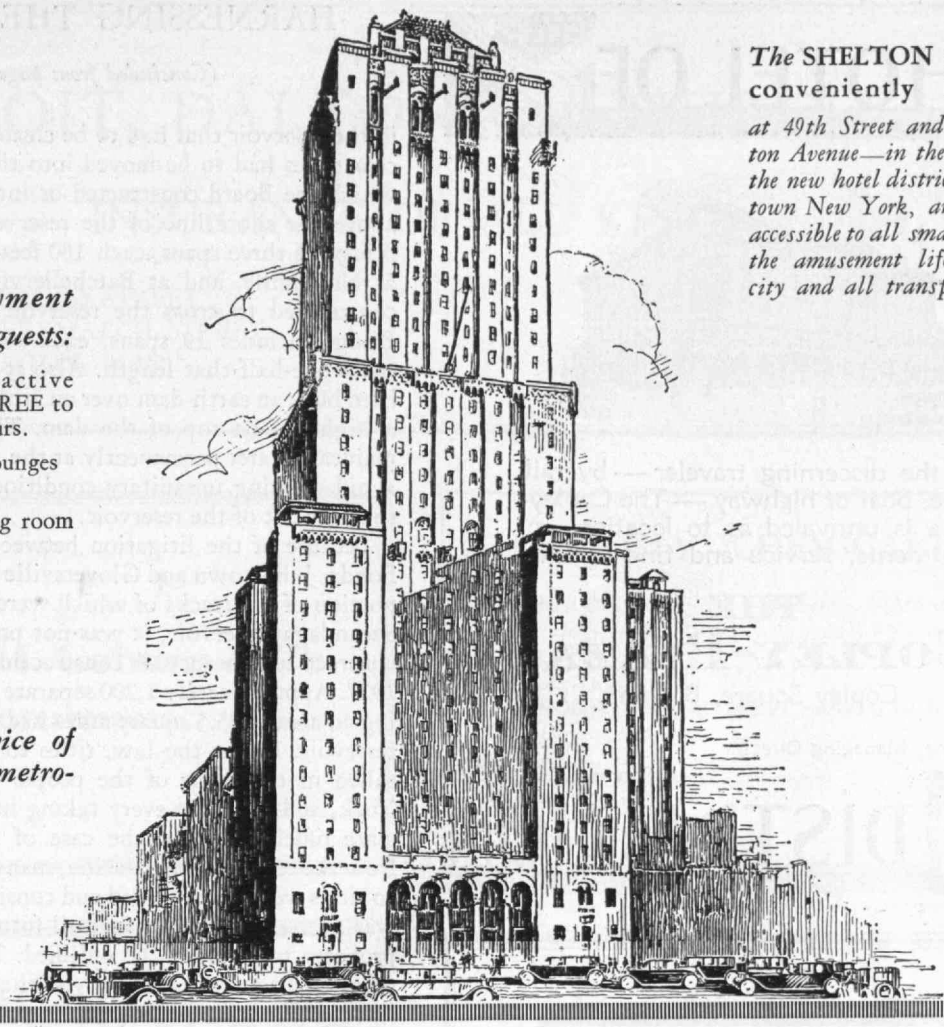
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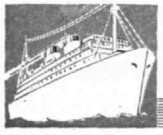


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HARNESSING THE HUDSON

(Concluded from page 100)

in the reservoir that had to be cleared; 3,800 graves in 26 cemeteries had to be moved into the six new cemeteries which the Board constructed or into existing cemeteries above the shore line of the reservoir. A new highway bridge of three spans, each 180 feet long, has been built at Northville, and at Batchellerville a bridge is being constructed to cross the reservoir. The Batchellerville Bridge includes 19 spans, each 150 feet long and two spans one-half that length. Also at Northville there has been built an earth dam over an arm of the reservoir with a highway on top of the dam. The dam was built to maintain water permanently at the reservoir crest and to avoid creating unsanitary conditions at the village due to any draft of the reservoir.

Because of the litigation between the Board and the Fonda, Johnstown and Gloversville Railroad Company, a portion of the tracks of which were to be flooded by the Sacandaga Reservoir, it was not possible to let the first contract for the actual construction until the spring of 1927. Approximately 1,200 separate parcels of land covering an area of 45.5 square miles had to be acquired for the reservoir. Under the law, titles to all property must be taken in the name of the people of the state of New York, and therefore every taking had to be approved by state officials. As in the case of property located far from the centers of population, many instruments relating to titles were not recorded and considerable investigation was necessary in order that all future claims on the real property taken could be nullified. Titles to some of the required land were so involved that it was necessary to resort to condemnation and every available method of securing judicial sanction to the acquisition. It was necessary to institute condemnation proceedings in about 125 cases although this does not mean that all of the parties involved in these condemnations were unable to agree, for there were instances when condemnation was the only method whereby titles could be cleared. Parties having an interest in property were scattered from coast to coast, and some as far distant as Australia. Twenty-six different commissions were appointed in condemnation proceedings comprising some 60 different attorneys and business men. The greatest difficulty was with the railroad above mentioned. After much litigation this barrier was at last removed and the construction of the reservoir went ahead.

Of course, the work of the Board of the Hudson River Regulating District has been facilitated by the fact that the Hudson River lies within the boundaries of one state. It demonstrates, nevertheless, what engineering can do toward preventing floods, and incidentally in furnishing new sources of power, for it is believed that within ten years there will be an installation of hydro-electric machinery along the banks of the Hudson that will exceed twice the present installation on the American side of the Niagara River. So the Sacandaga Reservoir will be a mighty balance wheel in the Hudson River system, and when additional reservoirs are completed the Hudson River will be a stream almost completely governed in its action by the people of the state of New York.

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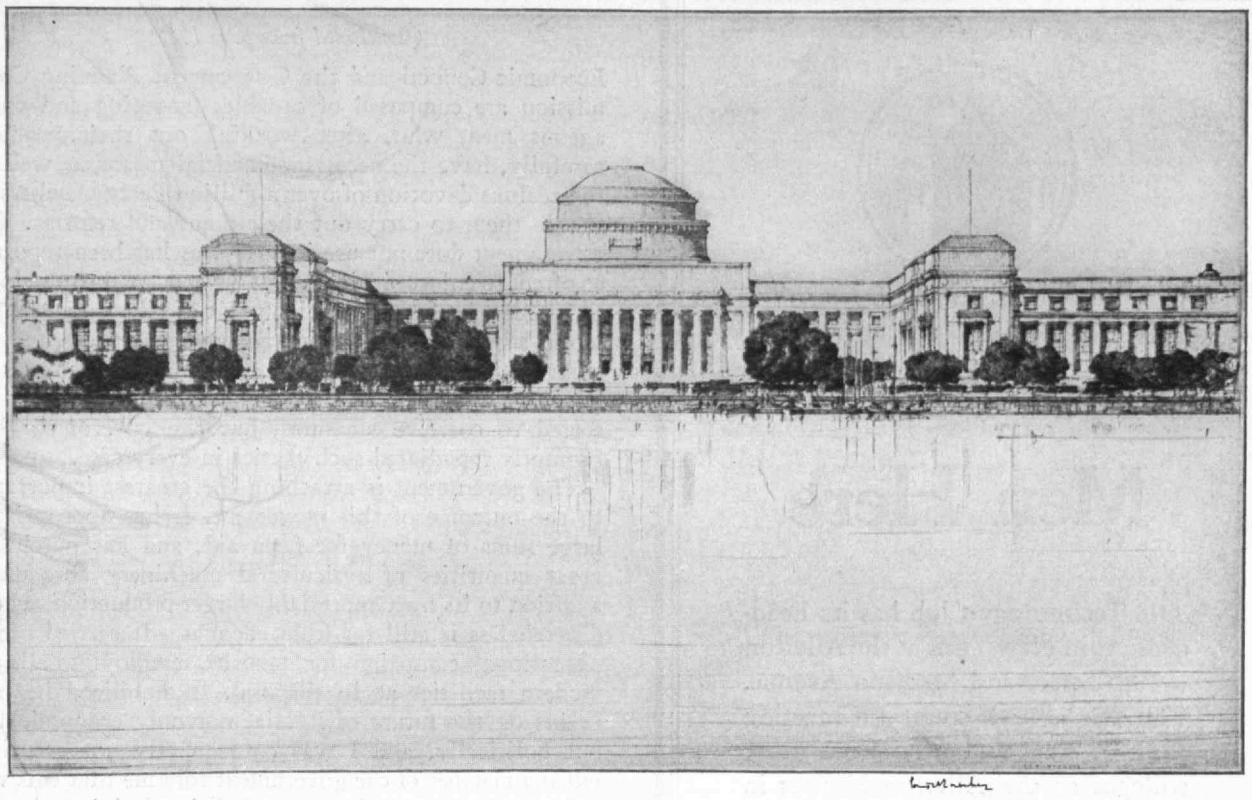
(Continued from page 78)

During the seven years of the World and civil wars live stock gradually disappeared, and most of these newly created farmers found themselves owners of small farms, but without the means of cultivating them. For years the government has tried, so far as its resources allowed, to help the poor farmers to acquire the necessary live stock and agricultural implements to cultivate their land effectively. Some of these have succeeded in meeting the difficulties of the situation, but the improvident and the less enterprising — and they were in the majority — were losing out in their struggle and began hiring themselves and their land out to their more enterprising neighbors, and so gradually a small land-owner class developed. The leaders of the revolution felt that if this were to continue unchecked, the fruits of the revolution, the complete liberation of the peasant, would soon be forfeited. It became necessary, therefore, to protect the less enterprising peasant from exploitation at the hands of the more energetic, and to improve and modernize the whole farm industry. Collective farming offered such a solution; the farmer would not be deprived of his portion of the land or of its proceeds, and the employment of power machinery would in that way become economical and feasible.

To test out the practicability of the plan, and to demonstrate the results obtainable on large tract farms worked entirely by power implements and under intelligent direction, the government created at strategic points a number of large government owned farms on land not heretofore under cultivation. The results were most gratifying, and the government then began to urge the small farmers to throw their small parcels of land together into large farms. It offered tractors and other power implements to such collectives on easy terms of payment, it assigned to them agricultural experts to instruct the farmers in the best methods of fertilization, and sowing, and in the kind of crops best suited to their land. This briefly was the basic motive and the plan of the collective farm movement launched by the government, and not as erroneously interpreted abroad, an attempt to take the land away from the peasants and make them day laborers in the employ of the State.

During the past year it was estimated that of the 27 million farms six million were poor, that is, without live stock, farm implements and other means of tilling their lands. These were the farmers that generally hired themselves and their lands out to the more enterprising farmers, who had possessed before the revolution, or had acquired since, sufficient equipment to cultivate not only their own small farms but those of their poorer neighbors as well.

In the Russian scheme of things certain factors favor carrying out radical reforms on a scale that would be impossible in any other country. First, the government not only holds the purse strings, but controls effectively the entire financial and industrial resources of the country. Second, it deals with a docile and patient people, which has a remarkable capacity for endurance and self-sacrifice, and yields alike to force or intelligent leadership or to moral suasion. Third, its Supreme *(Concluded on page 106)*



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(Concluded from page 104)

Economic Council and the Government Planning Commission are composed of capable, far-seeing and courageous men, who, after working out their problem carefully, have the necessary financial means as well as the zealous devotion of over a million Party members to enable them to carry out their plans and reforms. The government does not use its army, as has been reported so often, to enforce its ideas, but depends on the soundness of its ideas — from a Russian point of view — and upon moral suasion and education through the press and its party members. Over-zealous and fanatical members of the Party have repeatedly misinterpreted orders and resorted to coercive measures, but the government has promptly repudiated such tactics in every case.

The government is attaching the greatest importance to the outcome of this movement. It has appropriated large sums of money for farm aid, and has purchased great quantities of agricultural machinery abroad, in addition to its own appreciably larger production, which nevertheless is still far from adequate. It carried on an educational campaign for months, employing all the modern facilities at its disposal. It mobilized its best brains on the future of Russia, not only economically, but politically, and I was consequently not surprised when a member of the government told me that this was going to be the crucial year of their administration. If their plans succeed, they will have found the solution of the age-long farm problem, and one in harmony with their basic politico-economic doctrines. Professor Wilson, of the University of Minnesota, is here with a staff of assistants to advise the government in its agricultural program and I am told that he and his associates are expecting big results from the experiment. If they succeed, backward Russia may point to a solution of our own farm problem. Russia has about one-fifth of all the farm land of the world that is under cultivation; if the plans of the Soviet government materialize, she will in a few years have one-third. This prospect, while encouraging to Russia, in that she will then have a large exportable surplus of grain, will be disturbing to the preëminently grain-producing countries like Canada and Argentina, as it will to some extent to our own farmers.

It is well to reflect however, that the Russian people are not overfed, that the population is increasing at the rate of $3\frac{1}{2}$ to 4 million people a year and that increased consumption may keep pace with increased production.

Whatever our views may be of the Soviet Government and its political doctrines, the small group of men directing the policies and the destiny of this enormous aggregation of human beings, backward but with tremendous latent possibilities, are certainly practical and courageous realists.

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INSTALMENT FINANCE

(*Continued from page 75*)

invested, E is the fixed expenses per month, W the wholesale price of the articles bought by the dealer (in this case the finance company) for resale. It is not necessary to go back to the original meanings of the quantities $B+\beta_1-\epsilon$, $\gamma_1+\beta_2$ and so on, because they can be defined for our purposes as follows:

$B+\beta_1-\epsilon$ is that part of the cash realized on each article (here an instalment contract purchased by the finance company) which is reinvested and "sold out" again, in the form of new articles or stocks, one month after the sale of the original article;

$\gamma_1+\beta_2$ is the same for two months after; and so on.

In the auto dealer's case the first payment γ_1 on the instalment contract was "delayed" another month because it took by assumption one month to buy stock, receive it and sell it out again. Here (in the finance company's case) there is no such delay, so we simply put

$B+\beta_1=\gamma_1$
$\gamma_1+\beta_2=\gamma_2$ (for the fate of the ϵ, see below)
$\gamma_2+\beta_3=\gamma_3$ and so on, where γ_1, γ_2, γ_3, and so on, are the successive instalments of the purchased transaction. W is obviously the *advance* made by the company on the contract. We shall suppose that there is no holdback, or margin requirement. Then the term

$$\frac{\gamma_n+\beta_{n+1}}{W}\left(\frac{C-E}{C}\right)^{n+1}$$

drops out in the present case, and the stability equation becomes (on leaving out the $>$ sign)

$$\frac{\gamma_1-\epsilon}{W}\left(\frac{C-E}{C}\right)+\frac{\gamma_2}{W}\left(\frac{C-E}{C}\right)^2+\frac{\gamma_3}{W}\left(\frac{C-E}{C}\right)^3$$
$$+\ldots.+\frac{\gamma_n}{W}\left(\frac{C-E}{C}\right)^n-1=O$$

The meaning of this is that if this equation is satisfied, the volume v_t of new monthly deals will neither increase nor decrease as we approach the steady state (the state in which the instalments due from month to month from previous investments approach a constant value), but will approach a constant value.

Now this is obviously the condition that expenses just balance costs. ϵ was the cost of buying each unit-volume's worth of transactions. Let us begin by supposing that $\epsilon=O$, and that the sole cost is the interest charge on the invested capital, which is a fixed charge per month since the invested capital is constant. We can then represent this fixed charge by E as above. In the above form of the equation, C represents the total capital invested, including the allowance made to pay the first month's expenses. In the case of the finance company, we obviously do not want to use this quantity, but the net capital C′ invested in transactions. This causes the replacement of

$$\frac{C-E}{C} \text{ by } \frac{C'}{C'+E}$$

Now if we take $C' = 1$ so that E is the monthly interest rate on the invested capital, this equation becomes identical with that for determining (*Continued on page 108*)

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INSTALMENT FINANCE

(Continued from page 107)

the *actuarial interest* (or profit) *rate per month* P, with E here taking the place of P and W representing the net advance or principal of the transaction.[6] This proves without any possibility of evasion, that if the company's expenses are a fixed charge per month on the invested capital and all cash not used up in expenses is immediately reinvested, then E is the value which this fixed charge must take in order to just balance the income from the transactions. In other words, E is here assuredly the monthly rate of profit (or rate of yield, to use the language of instalment finance), if by yield we mean the rate at which dividend charges on the capital must be fixed in order to just balance income, the other expenses for the purpose of calculation being supposed to be zero, or if we assume that all expenses (dividend charges and others) are proportional per month to the outstanding capital.

On the other hand, we can suppose that the expenses are proportional to the total volume of new transactions during a given month rather than to the outstanding amount of capital. We shall not trace the various steps, but it may be shown by means of the stability equation that the present assumption about the time distribution of costs leads to the calculation of yield on capital by assuming that the ratio of principal to interest (or profit) in each instalment is fixed $\left(=\frac{1-\epsilon}{\epsilon}\right)$ and finding the average time outstanding of the principal accordingly. This is then the method of distributing the income in current use by the finance companies of this country and it gives the true yield rate, provided that we can assume that the expenses of the business are such that they can be considered equivalent to charging a certain fixed percentage ϵ for the volume of new transactions made during the month for which the charge is calculated.

(Concluded on page 110)

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INSTALMENT FINANCE

(Concluded from page 108)

THUS a system of calculating yield of distributing income more closely approaching reality would probably combine the features of the above two systems. The actual course of the business will determine what the earned income really is (i.e., the actual fixed and running expenses including allowance for profit) and it is from this distribution of earned income, so determined by an analysis of the business, that one must find out how to make the yield calculation, and in particular how to rationally fix the interest charges for any new kind of transaction one may contemplate using.

Principal should mean the particular sum of money whose history and vagaries determine the interest. Principal should also be the total advance on a transaction, since that is the capital invested in it, and it is the history and vagaries of this capital which determines the yield obtained on it. Certainly no other data are required to calculate the interest earnings than a statement of how much capital is outstanding during each successive period and the rate at which the outstanding capital is earning interest in each period, if that can be given; it is the quantity of the principal together with the average outstanding time of the principal that determines the interest.

But history cannot be invented beforehand in one's own study: it has to be discovered by looking at the actual events. So the history of the capital can only be found by considering an actual business (or making up a hypothetical one which can be considered typical) and as different businesses can well have different histories, it thus happens that there are several and many ways, correct ones, of calculating the yield on the capital, each one being, however, correct only for the particular kind of capital history which was assumed in deriving it. In any event and in any case the yield is to be and can be calculated ultimately by analyzing the costs, as has been said.

1. "Instalment Finance and the Efficient Use of Capital," *Harvard Business Review*, July, 1930; "Mathematics of Instalment Finance," *American Accountant*, July, 1930; "How Much Instalment Business Can I Do," *System*, April, 1930; "Capital Turnover Factors in Instalment Sales," October, 1930, *American Accountant;* by Otto C. Lorenz.
2. Decisions have been made by the United States Board of Tax Appeals accepting this method in the case of the following companies: Federal Services Finance Corp. of Washington, D. C.; 1st National Bank, Sonora, Texas; Chatham & Phoenix National Bank, N. Y.
3. "Capital Turnover Factors in Instalment Sales," *American Accountant*, October, 1930, by Otto C. Lorenz.
4. "Yield Per Cent Problems, etc." by Bruce Crawford Bailey; a series of tables published by Professor Floyd C. Emmons, Michigan Agricultural College; also an article in the March 1929 issue of the National Association of Finance Company *News*.
5. See the March 1929 issue of the National Association of Finance Company *News*.
6. This equation is not given here because of lack of space, but may be described in a subsequent article.

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RESEARCH

THROUGH this Division the equipment of the Institute Laboratories and the experience of its staff members are made available to a limited extent for the study of industrial research problems.

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THE Division maintains a list of graduates, with records of their experience and special qualifications for engineering and technical work. A list is kept of positions open.

Alumni are urged to report promptly changes of address, or changes of business connections. Officers of local Technology Clubs and Class Secretaries are urged to acquaint the Department with information which may come to their notice of Alumni interested to make new connections, or of positions open.

Address communications to Personnel Department.

DIVISION OF INDUSTRIAL COÖPERATION & RESEARCH

MASSACHUSETTS INSTITUTE *of* TECHNOLOGY · CAMBRIDGE

ADVERSARIA

Elected

¶ Franklin W. Hobbs '89, to the Chairmanship of the board of directors of the Textile Foundation.

¶ Merton L. Emerson '04, to the American Institute of Consulting Engineers.

¶ Anthony B. Arnold '07, to the Vice-Presidency of the American Agricultural Chemical Company of New York City.

¶ John M. Frank '07, to the Presidency of the Ilg Electric Ventilating Company.

Awarded

¶ To Henry G. Dooley '20, the Doherty Prize for 1929–30, with his paper on "The Neighborhood Electric Company." He was employed by the Blackstone Valley Gas and Electric Company from 1921–1925. Since 1925 he has been connected with the executive department of the Florida Power and Light Company.

¶ To Barnett S. Gruzen '26, the Rotch Traveling Scholarship for 1930. This scholarship provides $3,000 payable quarterly over a period of two years while the winner is traveling abroad. The subject of the program for the competition was "A Memorial to the Pilgrim Fathers."

Conferred

¶ On James F. Fouhy '05, the degree of LL.B. from St. John's College, Brooklyn, N. Y., in June.

Promoted

¶ Gordon B. Wilkes '11, to the grade of Professor in the Department of Physics at Technology.

Issued

¶ To Joseph W. Horton '14, of the General Radio Company, a patent on apparatus for television. This is a result of his former work at the Bell Telephone Laboratories.

Written

¶ By Chester L. Dawes '09, a chapter on Electrical Engineering in the third edition of Mark's Mechanical Engineers Handbook recently published by the McGraw-Hill Company, Inc. Mr. Dawes is Assistant Professor of Electrical Engineering at Harvard.

In the News

¶ Cass Gilbert '80, by reviving his plan for a suitable approach to the Capitol at St. Paul. Thirty years ago Mr. Gilbert designed the present Minnesota Capitol and also an approach or mall on which it was contemplated a magnificent public building group would some day stand. The Capitol was built, but the rest was neglected. However, St. Paul is now the center of a movement for the belated realization of the Gilbert mall.

¶ Charles Hayden '90, by arranging a nation-wide good will tour for the French flyers. Mr. Hayden is the head of Hayden, Stone and Company, and the director of 71 corporations (including Curtiss-Wright). Ambassador Morrow started the tour fund going with a substantial contribution, while Mr. Hayden mapped and arranged receptions, and solicited more subscriptions.

Deaths

¶ Reports have come to The Review since the last issue of the decease of the following:

¶ George E. Warren '82, on September 1, at his summer home in Brookfield, N. H. Some time after graduation, he organized the Rockingham Machine Company with a shop in Exeter, N. H., which he and his partner ran successfully for several years. They removed to Pawtucket, R. I., and after a few years the company was absorbed by the United Shoe Machinery Corporation. Warren joined this corporation in 1899 and for 31 years he was an able and valued employee. At the time of his death, he was head of the experimental department.

¶ Edward G. Osgood '86, on July 15, at Bradford, Vt. About two years ago he suffered a stroke of apoplexy from which he never fully recovered, and an enlargement of the heart ensued which brought about his end.

¶ Maurice W. Cooley '87, on April 27, 1930. For a more detailed account, see Class News section.

¶ Oliver F. Wadsworth '89, on May 30, at his home in Great Falls, Mont. He had been ill for a long time after a serious accident had left him bedridden.

¶ William P. Bryant '91, on August 20, at his home in Somerville, Mass., after a short illness. In 1893 he became rating auditor for the Boston Board of Fire Underwriters. He was a most efficient and loyal employee and continued with the Board for 37 years, having the title of supervisor of rating at the time of his death.

¶ John T. Dorrance '95, on September 21, at his home, Pomona Farm in Cinnaminson, N. J. He had been slightly ill for a few days, and the end came suddenly from a heart attack. Dr. Dorrance was President and founder of the Campbell Soup Company. Two years after graduation, he received his Ph.D. at the University of Göttingen, Germany, and while there he conceived the idea of making condensed canned soup. Upon his return to America, he went to work in his uncle's plant, the Joseph Campbell Preserve Company, as a chemist at $7.50 a week. He produced the first lot of canned soup in 1899, became a director and Vice-President in 1900, and was President and general manager 14 years later. Soon afterward, the concern became the Campbell Soup Company. In addition to his manufacturing interests, he was a director in a number of banks and utility concerns. He was a book collector of note and left one of the largest libraries in America.

¶ Theodore I. Jones '96, on September 12, at his home in White Plains, N. Y. After graduation he worked for the New York Telephone Company and later was with the Brooklyn Edison Company for many years, and an active figure in business circles in Brooklyn. A few years ago he severed his connection with that company and formed one of his own, the T. I. Jones, Inc., consulting engineers, in New York City.

¶ The Secretary of '00 reports the following death not previously recorded: Robert W. Burnett, Jr., on November 6, 1929. Burnett was at the Institute in the years 1896 to 1898 in Course VI.

¶ George H. Powell '04, on May 2, in Baltimore, Md. He had been a naval architect in Baltimore and Philadelphia and was associated with Cassatt and Company, bankers, in Baltimore.

¶ Arthur K. Mitchell '09, on May 5. He was connected with the St. Joseph Lead Company for about 15 years and at the time of his death, was assistant to the President of the company. During the World War he was Secretary to the War Industries Board.

¶ Daniel J. McCarthy '23, on July 7. Following his graduation from Technology he was a patent examiner at the U. S. Patent Office at Washington. In 1926 he went to New York where he was associated with the firm of Philipp, Sawyer, Rice, and Kennedy, as patent lawyer.

¶ Harold L. Turner '28, on September 13, at the West Penn Hospital in Pittsburgh. He died of pneumonia after an illness of about two weeks. In 1928 Mr. Turner received his degree of electrical engineer at Technology, and in recognition of his outstanding record, he was awarded the Swope Fellowship which honor led him to advanced engineering studies and his Master's degree in electrical engineering. It is a tribute to Mr. Turner that the corporation for which he was working when he received his fellowship retained him as a member of the organization while studying for his degree. At the time of his death he was assistant sales engineer, electrical division of the sales department of the Aluminum Company of America.

NEWS FROM THE CLASSES AND CLUBS

1875

The Review Editors' reminder of notes from the odd numbered classes caught me in Nashville on a sweltering afternoon, the thermometer in the shade hovering above 100°, and said notes were due in Cambridge in three days. Following my summer on Puget Sound, where oppressive heat was not in evidence, thoughts were beside the mark and doings were crowding.

My summer was delightful at every turn, with more bids for pleasuring than hours when I could keep awake. I renewed acquaintances with Technology men in Minneapolis, Seattle, Tacoma, Portland, and in British Columbia. Other than H. J. Burton '70 in Minneapolis, I was the oldest at these get-togethers, where my years and gray hair were becomingly considered, and much appreciated. Mr. Burton and family, particularly, gave me a hearty welcome and it is a great pleasure to talk Boston and Technology of the seventies. We are congenials of that bygone era seldom met in my wanderings afar. Their ideas and mine on this radio-aerial, jazzy progressive (maybe so), epoch are happy peas in a pod.

Wherever I dropped anchor on the Pacific northwest, the first question asked by Technology Alumni was, "What can you tell of our new President? Have you met him?" There was a shade of disappointment on my replying "No, I have not met Dr. Compton, but I have talked with those who know him." In brief, it is fine to note the interest taken in Technology in these distant places and I was glad to tell of all I have learned of the new President whom I shall call on soon.

Hibbard and Prentiss are the only classmates from whom I have heard in six months. I rejoice to chronicle that each is in as good health as can be expected 55 years after graduation. I may include myself in this, making it three cheery ancients. Both Hibbard and Prentiss stress the unprecedented heat of the summer which confirms all I have learned from east of the Continental Divide, while I reveled in comfort, sleeping under blankets each night, never once hearing a mosquito buzz. — HENRY L. J. WARREN, *Secretary*, 4700 Langdrum Lane, Chevy Chase, Md.

1882

At his summer home in Brookfield, N. H., George Elmer Warren, a much beloved classmate, passed away suddenly on September 1. He was born in Exeter, N. H., on October 1, 1860 and there he prepared for the Institute, which he entered in 1878, taking the course in mechanical engineering. The three years that followed were full of interest to him, particularly the hours spent in the shop, where he worked with an enthusiasm that characterized his activities through life. During those years, he lived in his home town 50 miles distant from Boston, making the round trip daily by train.

Some time after completing his studies, he organized the Rockingham Machine Company with a shop in Exeter, which he and his partner, Alfred Fowler, ran successfully for several years. They removed to Pawtucket, R. I., and after a few years the company was absorbed by The United Shoe Machinery Corporation. Warren joined this corporation in 1899 and for 31 years was an able and valued employee. At the time of his death he was head of the experimental department. He was a live wire, always working out some useful device. He made at least four automobiles and it is said of him that he delighted to wriggle under a car where, lying on his back, he would adjust some faulty mechanism. His winter home was in Swampscott, Mass., and the summers he spent on his farm in Brookfield, N. H. He married Miss Agnes Weston of Exeter who, with one son and two daughters, two grandchildren and a brother, survive him. Two of his classmates, French and Darrow, attended the committal service at the cemetery in Exeter on September 3.

From an article written by the well-known author, Judge Henry A. Shute, for a recent issue of the Exeter *News Letter* the following excerpts are taken: "It was from an occasional talk with officials of the company (The United Shoe Machinery Corporation) that I learned of his really great ability, and the fact that he was regarded as the father of automatic shoe machinery. Jack, as we all knew him, was slight, short, square-shouldered, erect, and extremely active in his movements. He had a most delightful personality, a very keen sense of humor, and a most infectious laugh. He played as hard as he worked, and worked for the success of everything he was interested in. A lieutenant in Company D, New Hampshire National Guards, he was loved by every member of the company. A member of the Glee Club (in which Judge Shute was also a member) he practiced as if his sole ambition was to become a troubadour. A member of the Unitarian choir, he spent the intervals between hymns in working out problems in mechanics. A member of the Exeter Cornet Band, he went through the Garfield campaign with the same delightful enthusiasm as in the Bell campaign when he was commander of the Bell Cadets. It was this sort of fun, and through enjoyment Jack got out of his play and out of his absorbing interest in his professon, that kept him active and efficient to the end." — ALFRED L. DARROW, *Secretary*, 8 Beacon Street, Boston, Mass.

1887

The Secretary is in receipt of information of the death on April 27 last, of Maurice W. Cooley, I, whose last known address was Hudson View Gardens, New York. Although a complete record of his work is not at hand, it is known that in 1900 he held the position of engineer of the T. and O. Railway at Toledo, Ohio, and in 1901–03 was manager of the National Contracting Company of Cambridge, Mass. From 1903 to 1907 he was manager of the New Trinidad Lake Asphalt Company, Port of Spain, Trinidad, B. W. I., and from 1907 to 1912 was manager of the Uintah Railways, Mack, Colo. In 1913 he was Secretary of the American Asphalt Association of St. Louis, and in 1924 was connected with the Central Commercial Company of New York.

The annual Class Dinner was held at the Parker House on June 6, and was attended by the following members: President Taintor, Secretary Thomas, Treasurer Draper, Very, Barton, Goss, Hussey, Cole, Sever, Carter, Sears, Lane, Cameron, Brainerd, Gay, Cushing, Curtis, Mullikin, and Shortall. At the All-Technology outing at Swampscott the following day the Class was represented by Thomas, Draper, Mullikin, and Very. — EDWARD G. THOMAS, *Secretary*, Toledo Scale Company, Toledo, Ohio. NATHANIEL T. VERY, *Assistant Secretary*, 96 Bridge Street, Salem, Mass.

1889

On June 12 last, the papers carried an announcement that Franklin W. Hobbs had been named by President Hoover as a member of the Textile Foundation. In commenting editorially the Boston *Herald* said in part: "The Textile Foundation, of which Franklin W. Hobbs of Boston has been chosen chairman by his four associates on the board of directors, has great possibilities for the textile industry in New England and elsewhere. The full board consists of him, Stuart W. Cramer of Cramerton, N. C., Henry B. Thompson of New York City, and the Secretaries of Commerce and Agriculture. The President himself named the three private individuals, as directed by the act, which also prescribes membership for the two secretaries. Thus, the trade itself will have a majority representation. As Mr. Hobbs is a thoroughly practical man, highly successful and recognized as one of the foremost leaders in the field, there is assurance that the funds at the disposal of the foundation will be directed to practical ends. No other office than chairman being provided for, the main responsibility will be that of Mr. Hobbs."

The sympathy of the Class will go out to L. E. Johnson in the death of his daughter, Mrs. Louise Alford Taylor,

1889 Continued

which occurred on April 27 last in New York. — Oliver F. Wadsworth died on May 30 in Great Falls, Mont. The following is from a Great Falls paper of that date: "Oliver F. Wadsworth, a pioneer of Great Falls, died here this morning, aged 65 years. He had been ill for a long time after a serious accident had left him bed-ridden. Wadsworth came to this section in 1890 and his activities led to the investment of more than half a million dollars by Boston capitalists. A brother, Eliot Wadsworth, a member of the Massachusetts Legislature and former Assistant Secretary of the Treasury under Mellon, is here."

A special dinner was held at the Union Club in Boston on the evening of June 6. Present were: Bliss, Bridges, Conant, Fiske, E. V. French, H. French, Gleason, Hart, Hobbs, Howard, Hunt, Kilham, Kunhardt, Laws, Lewis, Mauran, Mildram, Mott, Pike, Smythe, Spalding, W. L. Smith, Thurber, Underhill, and Williston. A feature of the occasion was the brilliant rendering by Lawry Mauran and Hollis French of those sterling old favorites "Drill, ye Tarriers, Drill," "The Party in Odd Fellows' Hall," and "I Never Could Understand." Those unable to be present missed a vision of spring days in the eighties, a glimpse of Old Boylston Street, and a whiff of youth. But the Secretary is growing sentimental! — WALTER H. KILHAM, *Secretary*, 9 Park Street, Boston, Mass.

1891

The sudden death of Billy Bryant was a great shock to the Secretary as it was to Billy's many other friends. We were in Course X together at Technology and both went into the insurance business soon after leaving Technology. In my many visits to the Boston Board of Fire Underwriters during all these years, I seldom failed to see Billy and have a little chat. He was always a cheerful soul, making the best of his difficulties, kind, ready to help in any way he could, and had what seemed to me an unusual fondness for his friends. I counted myself as one of them and I shall miss him.

The following account was prepared by Gorham Dana: "William Page Bryant died at his home in Somerville, Mass., on August 20, 1930, after a short illness. He was the son of John Bryant, a Boston assessor and was born in Charlestown, Mass., on July 16, 1869. He was educated in the public schools and graduated from the English High School in the Class of 1887, where he won a Franklin medal. He entered the Massachusetts Institute of Technology in the Class of 1891 and received his degree in chemical engineering. He had an unusual memory and the doggerel which appeared in the '91 *Technique*, beginning 'W. P. Bryant, the intellectual giant, can repeat word for word, almost everything he ever heard,' contained more truth than fiction.

"After helping his father in the real estate business for about a year after graduation, he went into the laundry business in Chelsea and later worked for the Board of Survey for a short time. In 1893, to quote his own words, he 'stumbled, or fell, or was pushed' into the position of rating auditor for the Boston Board of Fire Underwriters. He was a most efficient and loyal employee and continued with the Board for 37 years, having the title of supervisor of rating at the time of his death.

"He inherited a keen interest in politics and was chairman of the Republican City Committee for several years and a delegate to the Republican Convention. He was long interested in Masonry and was a member of the Coeur de Lion Commandery, Signet Chapter, Henry Price Lodge, A. F. & A. M. In 1913 he married Clara Bell Orcutt of Medford, who survives him. There were no children. Billy Bryant was very loyal to the Class of '91 and was seldom absent from our outings and Class Dinners. He was full of fun and his presence added much to our Reunions. He had his share of trouble and worry, but he did not allow this to dampen his ardor, or affect his evergenial manner. His kindly disposition endeared him to all who knew him and his loss is a great blow to his circle of friends and associates."

The following is from a New York paper: "Joseph H. Freedlander, architect, is President of the Fine Arts Federation of New York, the parent organization of the city's 16 art societies with offices at 681 Fifth Avenue. He resides at 850 Park Avenue. He was recently named as consulting architect of the Saratoga Springs Commission, and sailed on the steamer *Majestic* last Friday to visit the various European spas. Mr. Freedlander is the architect of the new Museum of the City of New York, now nearing completion at 104th Street and Fifth Avenue, as well as the Perry Memorial, Put-in-Bay, Lake Erie, Ohio, the New White Plains, N. Y., court house and the library for Andrew Carnegie. He was also the designer of the police traffic towers formerly located in Fifth Avenue and now removed, the architect for the building for the French Institute in the United States, of which he is a trustee, the new Harlem Hospital, the National Home for Disabled Volunteer Soldiers, Johnson City, Tenn., and the Portland Auditorium at Portland, Oregon. In 1914 Mr. Freedlander was made Chevalier of the Legion of Honor by the French Government. He is a graduate of the École des Beaux Arts of Paris and of the Massachusetts Institute of Technology and President of the American group of Société des Architectes Diplomes, as well as chairman of the annual Paris prize committee of the Society of Beaux Arts Architects."

Arthur Hatch reports that Frank Howard has retired. Frank hasn't confirmed this, but the Secretary is not surprised as Frank has had all he could do looking after his numerous grandchildren, and really had no spare time for business. Arthur suggests that he and I had better retire so as to be in style. Thanks for the compliment! — Barney Capen is still at Cohasset and enjoying his surroundings as much as ever. His father-in-law is seriously ill at the Carney Hospital in South Boston. Arthur Howland called on Barney recently and showed him his pictures taken on his trip around the world. Barney and Billy Bryant were close friends and Barney speaks very highly of him in a recent letter. "I first met Billie 43 years ago when we were taking our entrance exams for Technology and we have been close friends all these years. I knew his mother and father well and Billie and I used to study together for the exams Saturday afternoons and evenings alternately at his home and mine. Not only had I strong affection for him but I had a very deep respect and admiration for him because of his loyalty and devotion to his mother — a very dear lady. Billie was a home boy — loved his home and after he lost his father, his every thought and care were for his mother and he did all in his power for her comfort and happiness. She kept unusually young and bright and interested in his affairs. Dear old Billie, we all have a place in our hearts for him. I shall miss him, remember him with affection and respect and cherish his memory."

Barney says that 16 of his classmates, also 12 of their wives, and numerous daughters and nieces have been to see him. Where are all the sons, nephews and grandchildren? Also Mrs. Moore of Hartford and Mrs. Will Palmer? — George Hooper's daughter, Louise, was married on July 14 to Everett R. Smith in Pasadena, Calif. His son graduated from Sheffield Scientific School last June and will probably take a year at Technology to polish off. George's new address is 1075 Armada Drive, Pasadena.

A booklet on Denver, Colo., gives C. H. Harrington the offices of Vice-President of Board of Education and President of Museum of Natural History. He is one of our loyal members and one of the Secretary's best correspondents. One of his recent letters tells of a trip to the Carlsbad Caverns of New Mexico. "We left on a Saturday, going the first day to Raton, New Mex. Next morning we went on to Tucumcari where our museum here was digging elephant bones, some million years old and I wanted to see what progress was being made. Few people realize that in the ages gone by elephants, tigers, horses, camels, and so on roamed the great open spaces of the West. On our third day, we made Carlsbad and over roads like a board walk. No rain in this section since May 1929, so it was a barren waste but interesting, nevertheless. The caverns are 27 miles from town up the Pecos Valley for 23 miles, then into the Guadaloupe Mountains and up on top of a high mesa. The cavern is simply an enormous hole in the ground and goodness knows how originally found. We were fortunate in having a letter to Supt. Boles so were shown everything. Some 200 people went down with us. The descent is made first 200 feet by trail and steps to a very large room where a lecture on the caverns is given by one of the guides.

1891 Continued

"It is all wonderfully lighted by electricity. You wind on down through wonderful stalactite formation of every description and by noon come to the cafeteria where lunch is furnished. They can feed as many as 1,500 people in this room. After lunch we entered the big room which is 4,000 feet long, 300 feet high and in one place 600 feet wide. Stalagmites 16 feet in diameter and 30 feet high. A perfect specimen of every kind of formation from roof to floor and on sides. We were now 750 feet vertically from entrance and the pull out is hard on lungs. From 10:30 A.M. till 4:30 P.M. we were underground and covered nearly eight miles. The caverns have been explored for 30 miles and have not yet found bottom. The air is always about 60° winter and summer and as fresh as out doors. It is certainly one of the wonders of the world."

In a letter from Warner Steel to Barney, Warner tells of his trip to Bermuda and going to York Harbor, Maine, for the summer, where he has a cottage. — The Secretary ran across Francis Holmes and party on the *Priscilla* at the Fourth and last International Yacht Race. It was a glorious day, perfect for a yacht race and some credit must be given the *Shamrock* for beating the *Enterprise* some three minutes in the last 20 miles, even though she was badly beaten by the defender in the first ten miles. Both Francis and his wife were looking very fit. His company, the Plymouth Cordage, furnished the manilla rope for the *Enterprise*. — Charlie and Mrs. Garrison have headed West again for a year's trip. He doesn't expect to attend our Fortieth Reunion. We shall miss him as he is one of the regulars and always ready to do his share of the work and more. He has a second grandchild — a little girl this time. His daughter is going abroad for a year. His address on the coast is 2110 North Ross Street, Santa Ana, Calif. — Arthur Howland has resigned from Wadsworth, Howland and Company, with whom he has been connected for many years, and will be associated with R. L. Day and Company, Boston bankers. He has moved to 56 Concord Avenue, Cambridge. We have been neighbors for several years, only a floor apart in the same apartment house. Sorry, Arthur, to have you leave Radnor Hall.

A letter from Arthur Shattuck to Charlie Garrison tells of moving from Beverly Hills to Indio, Calif., wherever that is. "It is amazing how Mrs. Shattuck and I like this God-forsaken sandy desert. As soon as we arrived at the little hotel in Indio, and which is nothing to blow about, we seemed to acquire a new lease on life. Both of us became interested in everything going on, which wasn't much. The next day we bought a ranch. The ranch is composed of 18 acres of the sandiest sand dunes imaginable. There are some desert bushes on it but not a tree, a rock or a drop of water. My son, George, and I built a one-room cabin on it 16 by 26 feet, having 10 windows and two doors in it. We came down here on January 24, and lived in the hotel until some time in May. Since then we have been living in the cabin. Water for all purposes is brought to us in bottles. Other supplies are brought in various ways as they are needed. I have been home to Beverly Hills only three times since January. Twice I came back here bringing a severe cold with me and the third time I carried the grippe back with me. That grippe required the services of a gentleman of the medical profession who prescribed a bottle of liquid poison, a part of which I took internally and the balance of which, together with its container, I threw at a lizard. Mrs. Shattuck has been home more frequently and for longer intervals, but she has been here most of the time until the first of this month, when I persuaded her to go home and to remain there until the weather becomes cooler here.

"The weather is rather warm here in the summer time. Here is what it was in July: days, 100° to 116°, average 107°; nights, 64° to 88°, average 73°. I had a thermometer but it got broken. It did not blow up, but just got whacked by a swinging window. However, 104° or 105° here is not very uncomfortable weather. I am now putting down a well, and down is the correct and proper word to use. As becomes a man who was formerly in possession of sufficient intelligence to make both ends meet and to keep a jump or two ahead of the process servers, I calculated from all available information just how deep I would have to go for an ample supply of H_2O+X, and just how deep I would have to dig into my jeans to pay for that pleasure. Already I have had to multiply those calculations by two and the results are none too satisfactory. I am hoping now that I shall not have to draw on the Yang-tze Kiang. My garage is simply ornamental. I cannot get my car to it or into it because of the deep, dry sands. Consequently, I leave my car down town in a garage. Just at present it is at home but George will be here with it again tomorrow. I had a roadway graded from the paved highway to this chateau but lumbermen, well drillers, and innumerable pump salesmen have cut it all to pieces. If and when we get water and have a pump, I will scare up a bath tub. Now, a tomato can is substituting. Knowing how you love the desert, I really should write further on the subject and include many more details but being a very busy man, and having to pick the flies out of the soup before luncheon, I will have to draw this note to a close but perhaps I should explain that I am only seven miles from Indio on the paved highway from Palm Springs to Indio."

Arthur Alley received the usual birthday greeting from Barney (how we all would miss these annual greetings) and the following was taken from a letter which Arthur wrote Barney in August: "Since writing you my sister and I have taken several trips. Last summer we went to Alaska and had a wonderful trip, and this winter we went to Florida for a month. To me California is far superior in every way to Florida. We have just returned from a trip to Lake Tahoe in the high Sierra Nevada Mountains — a fascinating place. The lake is the largest, I believe, in America at such an altitude, over 6,000 feet. Part of it is in California and part in Nevada, 50 miles from Reno. I am still busy and enjoy my fruit ranch. I like it more the longer I am here. Please remember me to all the boys and tell them I miss them. My front door is always open to all '91 men."

H. I. Cole and his grandson called on Barney and took him to see their cranberry bog in Kingston, Mass. The bog is seven acres and they expect to get a crop of about 600 barrels. — Harry and Mrs. Bradlee sailed on July 19 for a trip abroad. Charlie Aiken sends postals from Australia, Sidney, Melbourne, and so on. He is apparently well and having a fine time. — Gorham and Mrs. Dana took a trip to Glacier National Park and so on this summer. Since then they have been at Lake Sunapee, N. H., down in Maine, and so on. It's a great life when you can do as you please. Remember the Fortieth Reunion in June 1931. — HENRY A. FISKE, *Secretary*, Grinnell Company, 260 West Exchange Street, Providence, R. I.

1893

The Secretary's apologies for his absence from the Reunion festivities were wirelessed to the Class at its annual dinner at the Eastern Yacht Club, Marblehead Neck, on June 6. At that time he was on the ocean, having sailed May 31 from New York on the *Lafayette* of the French Line on her maiden voyage. On this voyage, by chance, he met Grosvenor Marcy '05, who was headed for Switzerland to join his daughter for a motor tour in the Alps. During his six weeks' absence, the Secretary visited England, Scotland, Holland, France, and Germany — a trip devoted in part to business. In London he enjoyed the hospitality of two '93 men, Rigby Wason and Frank S. Badger.

For more than 20 years, Badger has maintained his headquarters and home in London, where he is engineer for J. G. White and Company, Ltd. His work in hydraulic and hydro-electric developments, however, has necessitated long absences from London and has taken him to various parts of Argentine, Uruguay, Chile, Brazil, Colombia, Ecuador, Burma, Australia, and New Zealand. Notwithstanding many years service in tropical countries, which has whitened his hair, in appearance he is much the same tall, thin, genial Badger we knew in our student days. He seems contented in the English atmosphere and is a good Londoner. He is looking ahead, however, to the days when he will retire and settle down somewhere in a moderate climate, perhaps the south of France or our own southern states.

Wason, who remained a bachelor throughout his active business life, which included as well much military service, extensive travel and a legal training, was married in 1924 to a charming English girl, Miss Dorothy Guendolen Hill. They have two children, a daughter and a son. Wason has now retired from business.

1893 Continued

The Wason's attractive London home is at 57 Onslow Gardens, South Kensington, their summer home being on the Isle of Wight. Having met some of our classmates in London, Mrs. Wason is keen to visit America and to attend some of our Technology functions. Ridby's interest in Technology and in '93 has not abated, and in his copy of our Thirtieth Anniversary Class Book he notes the changes among our classmates which have taken place since 1923. It is to be hoped that he and Mrs. Wason will come to America for the Fortieth Reunion in 1933.

Mr. and Mrs. Fred B. Abbott announced the marriage of their daughter Katherine to Alexander Hamilton Rice, Jr., on August 9, at Lynn, Mass. — Miss Ellen Taintor, elder daughter of Mr. and Mrs. Charles W. Taintor, and Yann Dedons de Pierrefeu, whose engagement was announced last December, were married at the Unitarian Church in Manchester, Mass., on July 12. — Our genial Class President, Billy Forbes, became a member of the Grandfather Club upon the birth on August 9, of a son to his daughter Barbara, Mrs. Arthur Hubert Hall, Jr., of Baltimore. This is his first grandchild.

Jim Emery writes that the first monthly luncheon meeting of the New York '93 group for this season will probably be held on Friday, October 31.

From Port-au-Prince, Haiti, where he has been stationed for the past two years, Charles H. Johnson has recently sent the Secretary the following interesting letter. This was written, by the way, in the early summer before the San Domingo hurricane. "I received the notice of the '93 Reunion all right and intended answering it, though of course I could not come, but mails are so uncertain here, outside of air mail, that I did not get around to it in time. It is about 24 years since I last saw Marblehead and the Eastern Yacht Club and 11 years since I last visited Boston, so I reckon things have changed a lot. The coldest weather I have seen in 22 years has been two or three frosty days in Florida in the winters of 1926–27 and 1927–28 and I hope never to see any cold weather again. Here in Haiti it is hot, but one can be far more comfortable than on some hot days in Boston because one knows the weather will not change. I stay out in the sun all day and walk five or six miles every week day and am never bothered by the heat. Sunstroke is unknown here.

"I am here as a construction engineer for the Public Works Department, Direction Generale des Travaux Publics, and I like the work very well. I have been on building work, as superintendent, until the last two months, during which time I have been building a road up into the hills to a place where I am to install a stone crushing plant. Since I came here I have brushed up my French so that I manage to get along very well and have also learned some of the Creole, which is the common language of over 90% of the Haitian people. A great many of the Haitians of the laboring class cannot understand French at all.

"The abnormally low price of coffee, the principal export crop, and the fact that one political faction has been out of office for 15 years, helped to fan the flame last year. Everything is quiet now and there are to be elections for a legislative assembly on October 10. There are 11 candidates for one seat as deputy in this district, and there are 51 candidates for president! The elections are to be held with ballots of different colors, as probably 80% of the voters are illiterate and will only know that to vote for their candidate they should vote a pink or blue ticket, as the case may be.

"Wages here are very low, laborers 30c to 40c a day of nine hours; carpenters 80c to $1.50; masons 80c to $1.50; and their ability is about according to their wages, though I think that one can get some kinds of work done more cheaply here than in the States. The average engineer or superintendent coming down here green from the States would stand a good chance of going crazy the first month and I suppose if I tried to run a job up North now I would be as badly off on a wholly mechanized job with a lot of jurisdictional labor disputes. The American engineers in the Government employ get fairly good pay and living here is very reasonable if one knows the West Indies and has no family with him.

"If you or any of the Class want an interesting experience, come to Haiti next winter and stay a couple of weeks or more and see the country and auto over to San Domingo and go home that way. It only takes ten hours from Port-au-Prince to San Domingo City in a Ford, and I think only a little over two hours in the plane which runs three times a week. If any of the fellows come down, I would be very glad to show them around if they let me know they are coming."

From Howard R. Sargent of Bridgeport we have received a copy of the August issue of *The Digest*, a monthly publication of the International General Electric Company, which has as its frontispiece a photograph of a remarkable portrait of Steinmetz with the following note of explanation: "Guided by a snapshot photograph of Steinmetz, taken while the master mind of mathematics and electrical phenomena was engaged at his desk, and guided more intimately by a personal memory of the man with whom he had friendly association in years past, Mr. Harold Mott-Smith, a staff artist of the General Electric Company, has produced a portrait of outstanding merit. His oil painting of Dr. Steinmetz preserves for posterity a lifelike presentment of the man whose career meant so much to the General Electric Company, to the engineering profession, and to the electrical industry.

"We are glad to show this to our readers and with it the likeness of the artist, as photographed in the latter's studio. The effect is startling; one might easily believe that the two men, leaning on opposite sides of a desk, were in conference and looked up at the same moment to greet the observer as he entered." Who does not remember Mott-Smith as Drum Major of the '93 battalion in our freshman military drill? He was an artist then as now.

Arthur A. Shurcliff, formerly Shurtleff '93, was one of the five members of the State Art Commission reappointed in August by Governor Allen. Shurcliff and his wife and children legally changed their name this summer, naturally giving them considerable newspaper comment. Shurcliff, as Arthur A. Shurtleff, is one of the best known landscape architects in the country. Mrs. Shurcliff is the only woman member of the Guild of Bell Ringers. The family is described in an article in *North Shore Breeze* entitled "The Shurcliffs of Argilla Road, Ipswich, a Family of 'Doers'," from which the following excerpts are quoted: "Mr. and Mrs. Arthur A. Shurcliff of Argilla Road, Ipswich, have a family of interesting young folk who are constantly 'doers' of something very worth while. For instance, their son, Sidney N. Shurcliff, who is working in Boston this summer and comes to Ipswich only on the week-ends, has just completed a book on his travels with Cornelius Crane of 'Castle Hill,' Ipswich, giving an account of Mr. Crane's recent cruise with his yacht *Illyria* on an expedition of scientific research, the book to be known as 'The Cruise of the *Illyria* through the South Seas and Jungle Island' and will be out in September from Putnam and Son of New York.

"Miss Sarah P. Shurcliff, the eldest daughter of the family, who was in Europe last summer, is teaching carpentry at the Fairhope summer school at Greenwich, Conn. Miss Shurcliff will also teach carpentry this winter at the Park School in Brookline, giving half day sessions to the work.

"William and Jack Shurcliff are attending Harvard summer school. Mrs. Shurcliff is busy, as usual, in the 'Old Shop, 1908' end of the house where she has a little class in carpentry. She belongs to the Boston organization of 'Peg-leggers,' makers of benches and trestle tables of pine.

"An addition has been made to the Shurcliff house and garden this year in the way of a tower from which a broad outlook over the Ipswich marshes and waters may be obtained. The tower was planned by Mr. Shurcliff and makes one of the most fascinating garden retreats imaginable in his rare combination of house, garden and shops, that have gradually grown upon the sightly hill he chose long ago for his summer place. The upper room of the tower has a sanded stone floor and a tiny fireplace, and is furnished as a comfortable den. Around the front doorway of the main house, the one that opens into the garden, the lobster pots and fish nets adorning the porch entry still continue to cast a spell over the occasional visitor, as does also the rambling house with its many doors, and the dates and letters of the alphabet that are painted here and there all about the house exterior. A house it seems to be

1893 Continued

that fits well with its family of workers." — FREDERIC H. FAY, *Secretary*, 44 School Street, Boston, Mass. GEORGE B. GLADDEN, *Assistant Secretary*, P. O. Box 1604, Boston, Mass.

1895

The hand of fate beckons us one by one. It is with the deepest regret that we learn of the death of Dr. John Thompson Dorrance '95, from the following clipping taken from the Boston *Evening Transcript* of September 22: "Dr. John Thompson Dorrance, founder, President and sole owner of the Campbell Soup Company, a pioneer in the field of condensed canned foods and reputed to be one of the country's wealthiest men, is dead in Camden, N. J. His end came suddenly from a heart attack yesterday at his home, Pomona Farm, Cinnamonson, N. J. He was 57 years old and had been confined to his bed only a few days by a seemingly slight illness. Members of his family were at his bedside when the end came. Funeral services were held at 10 A.M., Wednesday, September 24, Christ Church, Riverton, N. J.

"Dr. Dorrance is survived by his widow, Mrs. Ethel Mallenckrodt Dorrance, formerly of Baltimore, four daughters and a son. The story of his life was one of the great romances of American business. He rose from a $7.50 a week employee in his uncle's fruit and preserve factory to the head of a world wide business organization. Born in Bristol, Pa., he received his early education in Philadelphia, was graduated from the Massachusetts Institute of Technology in 1895 and two years later won his Ph.D. at the University of Göttingen, Germany. His early career was in chemistry and while in Germany he conceived the idea of making condensed, canned soup available in America.

"Returning to this country, he joined his uncle's firm, the Joseph Campbell Fruit and Preserve Company, and in 1899 put out the first canned soup. The product was received coolly at first, but through advertising he built up a world wide market and the firm, which in 1915 became the Campbell Soup Company, grew into one of the largest of its kind in the world. The stock of the Campbell Company, all of which was owned by Dr. Dorrance, was said to be valued at $150,000,000. In addition to his manufacturing interests he was a director in a number of banks and utility concerns. His active interest in French tapestries of antique weave and the extensive collection he made of them won him a decoration of Chevalier of the Legion d'Honneur by the French Government. He was a book collector of note and left one of the largest libraries in America."

A circular letter will be issued shortly advising the status of our active membership and a proposed plan for a three-year reunion in place of the regular Five-Year Reunion. — LUTHER K. YODER, *Secretary*, Chandler Machine Company, Ayer, Mass. JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, Inc., Graylock Building, New York, N. Y.

1896

Rockwell reports that he was able to make his annual trip to see his brother and sister at Harriman, Tenn., for a period of ten days early in August. He stopped in Washington on his way south, and later on, after his return, he made another trip to Washington. He was also away for a couple of days on a trip to his sister's in Rhode Island, and had a second fishing trip to Maryland, supplementing his usual spring trip there. In addition he has played golf on about every course within a radius of 25 or 50 miles of Boston, and in many cases Fred Damon was his opponent. In fact, the doctor says that he has become so thoroughly inoculated with the golf bug this summer, and he is in such fine form, that he finds it difficult to settle down to work again.

As for the Secretary, he worked hard around Technology up to the first of August, and then went to the ancestral home in Rye, N. H., where his work was just as hard but more of a manual variety. Early in September he and Mrs. Locke made their annual trip to her old home in Ontario, and then down to the Technology summer mining camp at Dover, N. J., where he had charge of mining instruction, and where Mrs. Locke helped to make things comfortable for him in the guest house. These notes are written on September 26 when he is back on the job again, getting ready for the opening of school on the Monday following.

The death of Ben Hurd was reported in the last issue. Every one in the Class knew Ben, as he was the acknowledged leader of the Class, and was active in various societies and in military matters and held the highest Class offices. He was born November 8, 1872, in Brookline, Mass., married Laura Noxon Toppan June 12, 1909, and their children consist of three daughters. Mrs. Hurd died a few years ago and after her death Ben's interest was strongly centered in his children, and he gave them everything that was in him in order to rear them as he knew Mrs. Hurd would have wished.

His career consisted of electrical engineer with Blood and Hale 1897–1899, firm of Hurd and Company 1900–1907, Hurd and Haggin 1907–1910, President of Fahirg Metal Company 1900–1914, manager of Western Electric Company 1914–1919, and Vice-President of the Susquehanna Silk Mills 1919–1921. He retired from work nearly ten years ago, as he found that the petty problems involved in manufacture, and dealing with consumers that were very unsatisfactory to deal with, irked him very much. Making his home in Nutley, N. J., which is a community made up largely of New York commuters, he found that civic affairs were in poor shape, and having the time and inclination, he threw himself wholeheartedly into the work and succeeded in bringing about a great improvement in political matters, and also in the general social and educational life of the community. During the war he created the Home Guard unit in Nutley and also the Defence League of New Jersey, a state organization which enrolled Home Guard units totaling over 20,000 men. He originated the war chest idea and the Nutley Patriotic Fund, and organized a counter-espionage service in the state for the Department of Justice. He was commissioned captain in the Inspector General's department of the state, and served as assistant to the camp inspector. He was a member of various clubs in Nutley, New York City, Virginia, New Bedford, and Nonquit, and held important offices in these clubs. After his retirement he lived in Nutley during the winters and in Nonquit, Mass., during the summers. His interest in Technology and in the Class was strong, and he had a record of perfect attendance at all of our Class Reunions after the first. Having participated in athletics as a student, he maintained this interest, and was the donor of a cup for competition at the annual Technology spring class meets in the 120-yard high hurdle, this cup to become the permanent property of the winner.

Mention was made in the last issue of sons of classmates who are going to Technology. The Secretary had the pleasure of receiving a call from Billie Haseltine, the son of William E. Haseltine of Ripon, Wis., who is entering as a freshman this year. His father had thought to accompany the boy East, but finally decided that he would prefer that the two of them make a trip together into the north woods as a form of vacation more desirable than a trip to Boston. However, the old man has practically promised to be with us at our Reunion a year hence. Another fellow who has appeared as a freshman is young George Merryweather and Minor Jameson's son is also here. Young Louis Morse is in his senior year now. Another chap who is in line to appear next year is the son of W. L. Root of Pittsfield.

The epidemic of sudden deaths in the Class is not yet over. Charlie Lawrence wrote on September 13, and enclosed a clipping conveying the sad news that Ted Jones passed away suddenly on September 12, 1930. The funeral was held September 15 at his home, 197 Hartsdale Avenue, White Plains, N. Y. Lawrence reports that Jones was the victim of acute indigestion. He was stricken while walking on the street in Newark, N. J., on a business call, and died within a few minutes. He had many friends, and his funeral was well attended. Tilley and Crane found it impossible to go, and Lawrence did not recognize any Technology men. Despite the request for no flowers, there was a profusion of most beautiful flowers of all descriptions. The service by an Episcopal minister from Brooklyn referred beautifully to Ted's practical religion, his loving pride of home and family, for whom he was an earnest and unstinting provider, and his abiding faith in his Master never wavered. Throughout his life he was most loyal to his mother and sisters, who were always his first consideration. He did not marry until his mother died, and even then he provided liberally for his sisters.

1896 Continued

He was born in Utica, N. Y. After graduation he worked for the New York Telephone Company and later was with the Brooklyn Edison Company for many years, and an active figure in business circles in Brooklyn. A few years ago he severed his connection with that company and formed his own company, T. I. Jones, Inc., Consulting Engineers, with office at 551 Fifth Avenue, New York City. For a long time he lived on Third Street between Eighth and Ninth Avenues in Brooklyn. He was a member of the Brooklyn Chamber of Commerce, Brooklyn Rotary, Montauk, Crescent Athletic, Municipal, Engineers and St. Georges Golf Clubs. He is survived by his wife, Mrs. Olley Losee Jones and a daughter Eliza A., and two sons, Olley V., and Theodore I., Jr. Ted was with us at our last Reunion in June with Mrs. Jones, and at that time appeared to be in fine condition, so that his death comes all the more as a shock.

Lloyd Wayne reports an interesting incident from Indianapolis. About the middle of August a young man called upon him, and stated that he was the son of Dr. Coolidge, and had graduated from Technology in 1926. The young man had previously called on Joe Stickney in Indianapolis, but did not see him. When Wayne questioned the chap he finally stated that he had not graduated but had spent a year at Technology in chemical work, and was now studying to be a doctor at St. Luke's Hospital in New York. He also informed Wayne that his uncle was Winthrop Coolidge '96 of Chicago, and when Wayne pointed out that this could not be the case, he said that he was not a blood relation, but only a social uncle. The fellow stated that he had been in an automobile accident and was getting back to New York, but the strange thing is that he did not try to borrow any money of Wayne. This story may be of interest to other classmates, in case the fellow calls upon any of them. He certainly is not the son of Dr. Coolidge.

In connection with the big job which Woodwell has at Lansing, Mich., he has found it necessary to establish headquarters there, and he is living at the Olds Hotel, and has a business office at 116 West Ottawa Street, Lansing, Mich. If any classmates should be in that vicinity, Woodwell will be delighted to have them call. While the International cup races were on, Woodwell planned to attend, and expected to be a guest on the *Blue Goose*. — CHARLES E. LOCKE, *Secretary*, Room 8–109, M. I. T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1899

Like "Ole Man River" time just keeps rollin' along. It will soon be two years since the last reunion of the Class of '99 was held at New London, Conn., where it was practically decided that it wouldn't do to wait five years before we forgathered again with our feet under the same table.

This is the first shot in a campaign for our next reunion planned for 1931. The shot may not be heard 'round the world, but it won't miss it much. My files show that members of the Class of '99 pursue life, liberty, happiness, and a living in 32 states of the Union; in London, England; in Montreal, Toronto, Ontario, and other places in Canada; Calcutta, India; Paris, France; Cuba, and British Columbia. My files also show that there is a lost legion of '99 men. Almost 100 of our number have dropped out of sight. On the file cards of these missing men appears the brief notation — mail returned.

Will each and every reader of this column appoint himself a committee of one to report to your Secretary the whereabouts and occupations of these missing men, if such information be available? Please call this matter to the attention of members who may not be readers of the column but should be. The last Register of Former Students issued in March 1930, shows the names of the lost legion. Members can secure a copy of the register through the Publications Office, at Technology.

The heat and drouth seems to have dried up the supply of news as well as the wells, rivers, and pastures of the country. I ran across only two members of '99 during the summer — Gardner Barry and Stan Motch. I met Barry in New England and Motch in Cleveland and talked over Technology affairs, including our next reunion, with both of them. Both attended the last reunion and are strong for the next one.

Please remember that we are members of the Nine Issue Club. We have promised to send in some news for publication in each issue of The Technology Review. Send in news for the next column promptly for old time's sake and your Secretary's reputation for veracity. — W. MALCOLM CORSE, *Secretary*, 810 Eighteenth Street, Washington, D.C. — ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston, Mass.

1900

Batcheller dropped in to see Bowditch the other day and was hailed by ye scribe on the way out. Looks just as young as ever and promised to write a full description of his auto trip from Corvallis. He was on the way to the Cape for a vacation and his mileage was 6,001 in the preceeding 29 days, a laudable attempt to reduce the gasolene storage. Full details in the next issue.

Oxnard, I, is now back in his home town in Houlton, Maine. In 1913 he went to Topeka, Kan., with the Santa Fe, remaining until last March. — At last a word from Bill Angus in Chicago and though short and sweet, was worth waiting for. He sends love and best wishes to all. — Keith, now a consulting engineer of Chicago, called in to the sanctum the other day on his way up from the Cape and wanted to be remembered to all the boys. He regretted very much not getting here for the Reunion in June and promised to be on hand next year.

The marriage of Mrs. Amy R. Wilder and Albert S. Merrill, both of Auburn, was solemnized at the summer home of the bride's uncle, Rev. Weston Attwood, pastor of the First Universalist Church, Abington, Mass., at Bailey's Island, Maine. Following the ceremony a luncheon was served by Mrs. Attwood and the couple left for a wedding trip and on their return will reside at their new home at 90 Park Hill Avenue, Auburn. Merrill was in Course X. — The Secretary ran into Neall on the street recently and got an earful of Class happenings. The former Class Day statistician, who now spends most of his time in his New York office, had just returned from his summer residence at Booklyn, Maine, and was the picture of health. He said that S. B. Miller, who started with '00 and now affiliates with '01, had dropped in to see him recently. — Everett was reappointed state highway commissioner by Governor Tobey of New Hampshire. More power to the Governor, as he knows when he has a good man.

We have just received notice of the death of Robert W. Burnett, Jr., of Kenova, W. Va., on November 6, 1929. Burnett was at the Institute in the years 1896 to 1898 in Course VI. — C. BURTON COTTING, *Secretary*, 111 Devonshire Street, Boston, Mass.

1901

On September 5, our classmate Lammot duPont was married to Mrs. Caroline H. Stollenwerck of Scarsdale, N. Y. The ceremony was a very quiet one at the home of the bride's mother, Mrs. Rodgers Wilson of Wilmington, Del. Lammot was attended by his son, Lammot, Jr. Only immediate members of the family were present. After a brief journey, they will make their home at the duPont estate, St. Amour on the Kennett Pike. The Class sends its warmest congratulations to the groom and its best wishes to the couple. In a newspaper clipping which came my way, Lammot is registered as the Class of '02. I have properly rebuked what Hodgins was pleased to designate aforetime as "Ye Ed" and I hereby call Fred Hunter's attention to the fact that we are informed and another effort on his part will be regarded as criminal libel.

Eugene Stillman Foljambe, who is almost as elusive as Le Bosquet, was sighted for a short time in Venice, Calif. He's not there now — the local Lido has lost its terminal vowel — but we expect to catch up with him again in the near future. C. I. Willard was the informant. — Harry Dart writes in that he is with the H. S. B. I. and I. Company. Those who are proficient in cross word puzzles, anagrams, and similar indoor sports, can fill out the missing words according to taste and fancy. — Roger Wight is *hors concours* — no, Joe, this is an architectural term and does not refer to food — as he lives in the same town. I wonder if he ever sees Harry. Anyhow, the answer will appear next year. — Bill, *ci devant* Fred, Freeman, is still pursuing his several associations but says nothing

1901 Continued

of his vocations unless a cryptic reference to a "beige cat" be one. I'm going to Portland to find out as Bill is a gracious, graceful, and unwearied host. I, who speak, affirm it.

Charlie Danforth, not Loring of that ilk, is President of his own company of analytical and consulting chemists and is in Youngstown, Ohio. Like Bill Pepperell, he is addicted to housing by the federal postal authorities and keeps open house for all '01 men at Box 448, presumably in the Youngstown temple. Charlie writes that he is interested in fluorspar — God knows why. Charlie doesn't say, but adds that he still plays tennis and handball though football is now but a joy of the past. I have a photograph of Charlie in football clothes, chiefly hair, that he would probably pay good money to suppress. — Phil Moore has recently written me from his ranche — the final e is silent — in the far West and on his stationary I found a variety of cabalistic signs that my own high grade of intelligence leads me to interpret as brands. There are three of them — count them — and I have been puzzling to resolve whether they are applied to different kinds of quadrupeds — the number precludes a sex discrimination — or if they are in the nature of degrees. One can see Philip walking in chaps — soft C — as if a little chafed and cutting out a group of promising youngsters — ignorance of the genus here cramps my style — for promotion to another incendiary orgy. It reminds old timers like us of the days when the press sobbed noisily over a cigar burn or two.

This is a brief letter this month — I can hear the sighs of relief — but I am far away from help and this is being penned in longhand by the party of the first part, which is I. For this reason, I disclaim all responsibility for errors, omissions, and perversions of fact which may enter in. Reading my handwriting is an intellectual pastime. More, but no better news next month. The Thirtieth Reunion draws in apace. — ALLAN W. ROWE, *Secretary*, 4 Newbury Street, Boston, Mass.

1902

The Secretary must plead guilty to the charge of failing to send in any notes for the last issue of The Review. The alibi is that he was off on a brief vacation trip at the time that said notes were due. In the course of his travels, on which he was assisted in holding down the auto by his three, no longer small offsprings, he tarried over night with Walton Sears and his family at their summer home, "High Field Farm," Bethel, Maine. This place of sojourn is an old farm in a clearing on a hillside 300 feet above the valley of the Androscoggin, with a wide view of hills and mountains. Here Mrs. Sears with her tall son, Walton, Jr., who is instructor in mathematics at the University of Vermont, and her daughter, Barbara, who graduated last June from the Massachusetts School of Art, spent a long summer and Walton joins them for the week-ends, driving up from Boston. When the secretarial car ascended to "High Field Farm," Walton had recently arrived to tarry over two week-ends and the gap between as part of his vacation.

The evening following their visit at Bethel found the Hunter clan at the Hermit Lake Shelter of the Appalachian Mountain Club in Tuckerman's Ravine, a third of the way up Mt. Washington. Here they were joined just before dark by Joe Philbrick and his son Edward who were planning on taking the same route over Mt. Washington and down into the gulf the next day. As the Secretary had not been to the White Mountains for four years and it was the first time that Joe and his son had essayed a mountain hike, it was a most happy coincidence that the two parties should meet as they did. The next day, August 31, the tramp was made as planned and as the younger generation was both able and willing to outstrip their fathers, Joe and Fred had a whole day for visiting together.

The All-Technology Reunion in June brought together the largest group of classmates since our Twenty-Fifth, three years ago. At the Class Dinner at the University Club, Boston, on the evening of Friday, June 6, there were present: Ballard and his son Joe, Jr., Bassett and his wife, Bosworth and his wife, Collier, Friend, Haskell and Hunter with their respectives wives, Kellogg, Kingsbury, Manning, Moore and Nickerson, Les Millar and his wife, O'Neill, Proctor, Ritchie, Adrian Sawyer, Sherman, Stimson, and Thurston, also Bert Philbrick, Reynolds and Robinson with their respective wives. Stover went one better by bringing both his wife and his son Roger. At a brief business session held after the dinner, Millar was elected Class President; Moore, Vice-President for Boston, Kellogg for New York, and Fisher for Chicago. Bert Philbrick was re-elected as Assistant Secretary. On account of his removal to Philadelphia, Fisher has resigned as Vice-President and the vacancy will be filled by the board.

Clyde Place had sent on the Class movie, which he made up from films taken at the Twenty-Five-Year Reunion of the Class. He also sent some films taken at the Class outing in 1928 at Boxwood Manor. These films, which were new to many of those at the dinner, were greatly enjoyed and by request Ritchie ran them through twice that familiar faces might be recalled and less familiar ones identified. After this showing of Class films some comic strips furnished by Ritchie added to the good time of all present. The party broke up in good season, some going to the dancing at the Statler and others to see the illumination of the Institute Buildings.

At the general banquet at the Hotel Statler on Saturday evening, which was the climax of the Reunion, the following classmates were present who were not at the Class Dinner the night before: Eames, Lowe, Porter, Walter, and Dr. and Mrs. Williams. Classmates noted either at the Open House at the Institute on Friday or at the Swampscott outing on Saturday were Wales and his wife, Gardner Rogers and his wife Miss Beckler and Miss Bates. Also three young Hunters and two young Bosworths took in some of the daytime affairs. Reynolds won the putting contest at Swampscott, and also defeated Bert Sherman by a close score on a baby golf course. Les Millar also took part in this last affair, but his recent election as Class President, or something else, threw him off his game and his score was — well, we won't record it in print!

Dana Fisher is now in the main office of the V. V. Fittings Company at 705 Cherry Street, Philadelphia. For the past ten years he has been in the Chicago office of the same firm. — McKechnie has gone to Russia as a mining engineer. His address is United Soviet Socialist Republic, Uralsky Oblast, Magnitostroy. — Harvey's address is 3264 Blaine Avenue, Detroit. — Paul Weeks has come part way across the country. He is still with the Caterpillar Tractor Company at their plant at Peoria, Ill., instead of their California plant at San Leandro, where he has been for the past three years. — A report of the Class outing held at Saybrook, Conn., a week after the All-Technology Reunion, will appear in the next issue of The Review. — FREDERICK H. HUNTER, *Secretary*, Box 11, West Roxbury, Mass. BURTON G. PHILBRICK, *Assistant Secretary*, 246 Stuart Street, Boston, Mass.

1904

Please accept my apologies for keeping you waiting a month for your Class Notes. While on my vacation in August, I received a note from the Editor of The Review stating that Class Notes for the October issue of The Review were due in the Review Office on August 25. When I take my vacation I take a complete rest and do no work of any sort, Class work or otherwise. So long a time has elapsed since I wrote you last that I think I had better present my offerings in chronological form.

The first item I find in my files is a short note dated March 24, 1930, from Harry Rollins, written while on his European trip as mentioned in my notes in the May issue. He says, "I was sorry not to have seen you while in Boston but will hope for better luck next time. Have had a delightful trip so far, with day in Gibraltar, Algiers, Monaco and Nice. We are standing in the harbor at Naples now. I am up before breakfast today and we are expecting an interesting day." From the foregoing it may be that Harry lay abed on some occasions during his trip.

The next item was also from Harry dated April 7, on a picture post card showing the interior of a mosque in Cairo, Egypt. This card also bears the post mark of Naples. He writes, "Am rather 'fed up' on Mosques and will be glad to get back to Europe. Had an interesting time though in Egypt and am looking forward to a pleasant week in Sicily. We arrive in Syracuse tomorrow."

When Harry called me up the first of March he expected to be back in time to attend the Class functions in June, and,

1904 Continued

although he arrived in this country, other matters prevented his attending any of these affairs.

The next item of interest came from General Holcombe under date of April 10 and describes the 50th Anniversary meeting of the American Society of Mechanical Engineers.

"The Class was represented at the A. S. M. E. 50th Anniversary at New York by Selby Haar, and at Washington by Haar, A. R. Holbrook, and Holcombe. Haar had his mother and sister with him, and missed nothing on the program, which was chiefly notable for the number of dignitaries from all the industrial countries of the world. The first day was taken up with presentation of greetings, written and spoken, from a hundred or two engineering societies and educational institutions of this country, Europe and South America, with a very brilliant reception in the evening. The second day was filled with monographs by distinguished engineers on the progress during the past half century, more especially the advancement of human welfare at the hands of the engineering profession, and with the presentation of twenty odd medals. A luncheon and formal dinner were the occasions for more speeches, including one by President Hoover. The outstanding speech was made by R. A. Millikan, Head of the California Institute of Technology, on the bonds between science and engineering.

"At the Army Ordnance Association luncheon on Wednesday, which was attended by some of the delegates, Professor Miller and the Ordnance Unit at Technology and Colonel Theodore Hoover and his R. O. T. C. work at the University of California, were the only schools mentioned. Industrial preparedness as the best assurance of peace was the keynote of this gathering. The program ended Wednesday afternoon with a big reception at the White House. They were three memorable days of most exceptional tributes to engineering the world over, the best known names in science and industry in person."

I was very glad to know that our Class was represented at this meeting and the General's information was confirmed by a letter from Selby Haar under date of April 21. "Please enter on your records a new address for me as follows: 25 West 68th Street, Apartment 3-A, New York City. In Washington a week or so ago at the meeting of the American Society of Mechanical Engineers, I met Holcombe and Mrs. Holcombe and had a pleasant chat. It was my first opportunity to meet Mrs. Holcombe and I hope to call upon them again in the near future. Our new subway system is progressing steadily. We are getting out contracts for equipment of the first section which runs down the west side of Manhattan from 212th Street to the Fulton Street Hudson Terminal. It is expected to be in operation in the fall of 1931."

I am obliged to record the death of another of our classmates. On May 2, George Hardy Powell died in Baltimore, Md. Many of us knew George very well, and although circumstances had prevented his joining us at the Class Reunions, we note his passing with sorrow. He had been a naval architect in Baltimore and Philadelphia and was associated with Casseatt and Company, Baltimore, bankers. He had made his home with his father, Rev. Arthur Chilton Powell, and is survived by two sons.

We now come to the events of last June, the first of which was the participation of the Class in the All-Technology Reunion, during which a new President of the Institute was inaugurated. On June 6 the Class Dinner was held at the Brae Burn Country Club, West Newton, and was attended by 23 classmates and wives. Dave Sutton made arrangements so that all members might play golf at the Brae Burn Club during the afternoon, but the only members who seemed to be interested were Mr. and Mrs. Chick Emerson, who played with Dave and were obliged to go outside the Class to find a fourth member for a foursome. After a very excellent dinner the entertainment of the evening was provided by our moving picture expert, Tammy Rockwood, who showed us the Class movies and also many good pictures of his trip through the Yellowstone Park and other places. After this entertainment, a bridge party was conducted at which the first prize for ladies was won by Mrs. Rockwood and second prize by Mrs. Emerson. In order to make prizes a family affair, Chick Emerson won first prize for men and second prize went to Carl Hayward. Those present were Mr. and Mrs. Ingram and their daughter, Betty, Mr. and Mrs. Hayward, Mr. and Mrs. Rockwood, Mr. and Mrs. Sutton, Mr. and Mrs. C. J. Emerson, Mr. and Mrs. Stevens, Tripp, M. L. Emerson, Paul Peacham Paine, Allbright, Phil Sweetser, Hale, Galusha, Ferris, Holbrook, and Porter. The most remarkable thing about this event was the absence of Hump Haley, who never has explained why he was not present. At the inauguration exercises Shorty Holbrook represented the University of Pittsburgh in the parade of dignitaries.

On June 7 at the all day outing at Swampscott the Class was represented by 21 members and wives. In addition there were four daughters present, but no sons. There is not very much to be said for this event. There was a more or less successful parade of classes in which we occupied our rightful position and the Class pennant was carried by Peacham Paine, he having won that honor by having traveled the longest distance to attend the Reunion. Rockwood took moving pictures of various members of the Class and of the parade. Those attending were: Mr. and Mrs. Ingram and daughter, Betty, Mr. and Mrs. Hayward, Mr. and Mrs. Parker, Mr. and Mrs. Rockwood and daughter, Mr. and Mrs. M. L. Emerson and daughter, Mary, Mr. and Mrs. Stevens, Holbrook, Paine, Mailey, Galusha, Kaiser, Munster, Haley, Barnaby, Porter and his daughter. Gus Munster had charge of the bus transportation from Boston to Swampscott and there was plenty of room for everybody.

The affair at Swampscott broke up about four o'clock in the afternoon as everybody was anxious to get back to Boston in time for the big banquet at the Statler Hotel. It is unnecessary for me to make any record of what transpired there as it has been given in full many times. The Class representation at the banquet was Mr. and Mrs. Ingram and their daughter, Betty, Mr. and Mrs. Parker, Mr. and Mrs. Rockwood, Mr. and Mrs. Hayward, Mr. and Mrs. Stevens, M. L. Emerson, Galusha, Tompkins, Phil Sweetser, Tripp, Porter, Haley, and Moore.

The annual Class Reunion was held as usual at East Bay Lodge, Osterville, on June 27, 28, and 29, and was more successful in point of numbers attending than the last one previous to the Twenty-Fifth Anniversary. In the matter of good fellowship and companionship, no Annual Reunion is ever more successful than any other. On June 27 previous to the trip down the Cape, there was a small luncheon at the University Club. M. L. Emerson, Haley, Sutton, Ferris, Comstock, Galusha, and Holcombe were present. The most remarkable thing about this Reunion was the fact that for once we had absolutely no rain throughout the time we were on the Cape, although as I remember it there was considerable rain during the afternoon while the boys were on their way down.

There is not much to be said about this Reunion as the program followed very closely along the lines of others. On Saturday evening the Annual Class Meeting was held, at which no business was transacted, as usual. Tammy Rockwood exhibited his latest movies of the Class, including those which he took at Swampscott and which were taken in colors and proved to be very interesting. Sunday some of the boys went to Eastward Ho at Chatham to play golf. There was no stated golf tournament this year and therefore as there were no prizes, no records were kept of the scores made. Those present at the Reunion were Munster, M. L. Emerson, Haley, Phil Sweetser, Rockwood, Sutton, Hartshorne, Gene Russell, Parker, Bill Anthony, Jack Draper, Galusha, Dennis, Buck Langley, Phinney, Read, Haines, Holcombe, Comstock, C. J. Emerson, and the Secretary. We were very glad to welcome back again Buck Langley, Bill Anthony, Jack Draper, and Don Galusha, whom we have not seen at reunions for several years. There does not seem to be much else to chronicle about this reunion except that as the years pass by they seem to mean more and more and those classmates who fail to attend are surely missing something.

Under date of July 8, I received a letter from Selby which is as follows: "I hope that the Class Reunion was a success. We are very busy getting out contracts for equipment of our new subways so I couldn't get away. Better luck next year." I am pleased to assure Selby that the Reunion was certainly a grand success. — Charlie Homer has entered the ranks of those who write letters to news-

1904 Continued

papers for publication on the editorial page and after reading the following effort I think you will all agree that Charlie has been concealing from us certain abilities. "We pride ourselves on our prophylactic qualities. Just a pleasant Sunday afternoon drive of a business man back to work. Leave the vicinity of Portland, cool and smiling. State road a little crowded but fair going. Arrive at a large Neon sign reading Bunk Beach, the rest of the Kennie dead. The Mrs. got tired of a Manchester coach riding on the back of her neck, so I got the old cart up to 80 when the coach went by. On, with Henry becoming thicker every moment, until approaching Bossy Gillis's playground. Three miles, single file, crawling to the neck of the bottle, Newburyport turnpike and some shower! Thanks to Top O' the Morning, no change my disposition."

I have received an announcement of the marriage on August 16 of Edwin P. Tripp to Miss Clara Lindsey McComb at Springfield, Mass. — The last and most recent item of news to come to my attention is the report by Cy Ferris of the sixth addition to his family in the person of James W. Ferris, born September 16, 1930. Cy now has four sons and two daughters and we all offer our congratulations to him.

I feel quite satisfied with the amount of space I have occupied in The Review notes by this letter to you, although it represents an accumulation of six months' news and therefore should occupy quite a space. Please bear in mind that I shall have to write to you again in two months, so do not hold back the vast amount of items of interest which you must run across from time to time and which your classmates would be very pleased to know about. — HENRY W. STEVENS, *Secretary*, 12 Garrison Street, Chestnut Hill, Mass. AMASA M. HOLCOMBE, *Assistant Secretary*, 3305 18th Street, N. W., Washington, D. C.

1905

The Twenty-Fifth Reunion was held, as scheduled, at Oyster Harbors on June 3 to 6. Fifty-five men and wives attended and agreed that it was the best place we have yet found for the purpose. The club house was charming, the food delicious, the water warm, and the golf course good. The attendance was disappointing, being far below that at Marion five years ago. In all other respects the Reunion was a success. The club was shared by a jolly crowd from '00 with whom we shall all be glad to reune again.

A large troup went out for the golf cups, donated by Bob Farrington. Billy Ball, as usual, took the low gross while Elmer Wiggins got the low net. Ralph Hadley found no worthy opponent in tennis and the usual tournament was not held. Dancing was on each evening to the music of a good orchestra ably directed, much of the time by Louie Killion who was finally induced to render his famous Harry Lauder songs first heard by most of us at East Bay Lodge. Our faithful co-ed, Mildred Wheeler (Tompson) and her husband came down from Seekonk and spent an afternoon and evening with us. Two westerners, Jones and Ortseifen, with a couple of deep seamen, Davis and Tower, had a sail at Hyannisport in a genuine Cape Cod cat-boat and a good breeze.

At Oyster Harbors were the following: Bill and Mrs. Ball, Jules and Mrs. Barnd, Charlie Boggs, Ed and Mrs. Barrier, Henry Buff, Harry and Mrs. Charlesworth, Frank and Mrs. Chesterman, Prince and Mrs. Crowell, Carl and Mrs. Danforth, Joe Daniels, Phil Darling, Al Dickerman, Ros and Mrs. Davis, Toots Dissel, Bob Farrington, Wes and Mrs. Gilman, Fred Goldthwait, Carl Graesser, Ralph and Mrs. Hadley, Charlie Hawkes, Louis Killion, Gene Kreigsman, John Loughlin, Roy Lovejoy, Bob and Mrs. Lord, Leon and Mrs. Morrill, Adolph and Mrs. Ortseifen and the boy, Al Prescott, Roll and Mrs. Prichard, Henry Stevenson, Sid Strickland, Al Sweetser, Mildred Wheeler and Mr. Tompson, Gib Tower, Harry Wentworth, Walter Whittemore and Elmer Wiggins. Joe Daniels from Seattle was the long distance traveler. Movies of domestic size were taken by Davis and Wiggins. They have been edited and titled and will be sent to any member of the Class who will undertake to show them, to classmates if possible, and return within a reasonable time.

Friday morning more '05 men were found at the Institute and more still appeared at the Sheraton for the Class Dinner. Forty-five sat down to a jolly party. The new faces included Allen, Babcock, Bartlett, Burns, Cole, Donald, Files, Gerry, Gilbert, T. Green, Kenway, Keith, Landers, Mayer, McLean, Mitchell, Spalding, Thomas, Wilcox, and Winship. Bob Lord, toastmaster, was in rare good form and kept things moving all the time. Radio greetings were received from Grove Marcy, who was on the sea en route to France, and a reply sent. As he sailed away Grove had written: "I hate like the devil to miss this Reunion. The Class of '05 and its friendships has occupied a large place in my life, and I owe it much. You can tell the boys I'll be at the next one if I have to come on one leg, and please give everyone my love."

Bob Farrington, Chairman of the Reunion Committee, is to be congratulated upon the success of the entire reunion and thanked for all the hard work that he did. Did anybody take still photographs at Oyster Harbors? If there are any, we should have copies for the files.

Mildred Wheeler (Tompson) wrote of the Reunion: "It certainly was good to see the boys again — some of whom I had not seen during the 25 years. It is too bad that more of them do not attend the reunions. I am sure of one thing, if they came once and had as good a time as I did, it would take an earthquake or something equally strong to keep them away."

Never a word from Charlie Mayer for years until the Reunion report when he sent the following message: "Hat size now 5¾, reduced in 25 years from 7¾." Will someone kindly furnish the key? — Jules Barnd is now manager for Ohio of Wilk, Clarke and Company, Investment Securities, Chicago. His office is at 117 West Market Street, Lima, Ohio. — The Federal Farm Board plans the development of a coöperative marketing association for the apple growers of New England. Here is where Bob Lord and Grove Marcy come into their own, and Grafton Perkins as well. Grafton's boy has just entered the Naval Academy. — Mitch Mackie has two boys, one of whom he says is headed for Technology. He expected to drive East late in June but has not been reported. — T. Green's boy, Ted, Jr., graduated from Technology in June.

The Carnation Milk Company has moved its headquarters from Seattle to Oconomowoc, Wis., where Wallace MacBriar is now located. He writes: "I'm here in Oconomowoc permanently, for the time being at least. Came here last September (1929). Our Company reversed the usual order of things. We started in the West and expanded into the East. I suppose you would call this West, but to a Pacific Coaster, this is the East." — Elmer Wiggins has become air-minded. He has purchased a Spartan biplane equipped with Wright Whirlwind 225 h.p. motor to enable him to keep in closer touch with his customers. He has also become New England agent for that plane and is all ready for demonstrations. Let's go! — The New York *Evening Post* carried a lovely photograph of Oscar Merrill posing *Unter den Linden*, Berlin. — Jim Fouhy, who is manager of Smith Service, Engineers, appraisers and insurance managers, New York, received his LL.B. from St. John's College, Brooklyn, in June. There is some doubt as to how much he enjoyed his final examinations after a pause of 25 years.

George Rhodes did not go to Berlin after all. He says: "You are on a wrong track in thinking that Oscar Merrill and I were up to anything in Berlin. As a matter of fact I have never been to Berlin and the nearest I have ever come to the place was to secure an urgent invitation to present a paper on the "Transportation of Natural Gas" before the World Power Conference in Berlin last spring. Perhaps you had heard of the invitation and assumed that I had accepted the same. (His name appeared on the official program.)

"I certainly would have done so had it been possible and would be tickled to death to get a vacation as free from office interruption as a trip to Berlin would afford. As a matter of fact, however, I was so busy building natural gas pipe lines and am still so busy doing the same thing that any thought of a trip to Berlin or the writing of a paper on the subject is quite out of the question.

"Perhaps you don't know it, but the building of natural gas pipe lines just about represents the peak of speed in construction. Money goes through your hands like water down the Niagara River, and the way a pipe line grows is little short of marvelous, even to the man who is used to it. Last year the natural gas pipe lines built under my direction, some of it quite intimate, aggregated

1905 Continued

almost 1,500 miles and represented an expenditure of close to $50,000,000 which was all done between May first and the end of the year. Of course, the work was divided into three or four jobs but one of them accounted for 60% of the total mileage.

"It is most fascinating work but it makes a fellow a stranger to his family and on that account it isn't as much fun as it might be. It also keeps a fellow from seeing his friends and this year was completely effective in preventing my attending the Twenty-Fifth Reunion to which I had been looking forward for five years. I am now looking forward to the Thirtieth Reunion and hope by that time I will be entirely through with the pipe line game, which after all is a funny game for an electrical engineer."

Boggs and Davis sailed in another ocean yacht race to Bermuda in June. This was Charlie's third sail down and shows how fascinating the sport is. According to Ros it was easy going both ways. But, he says: "On the way home, we had about ten minutes of the liveliest going possible, when we caught a squall that blew well over 75 miles an hour through which we sailed under storm jib with the rail under, later taking in the jib and finishing under bare pole, galloping faster than we ever saw *Duckling* go. I had the stick and the time of my life. During a calm, we were visited by a shark who came close up to the stern, evidently to read the name. I got a good movie of him, of a 'portuguese man o'war' and of a school of porpoise that played under our bow for a half hour. One of the interesting events was sailing through a mile of New York garbage out of sight of land. Quite as interesting was the navigation of New York harbor by night and our inspection at Quarantine by Customs, Immigration and Public Health officials who came aboard from a tug three times our length and who tried to treat our 37-foot craft as they would a liner. Perhaps Charlie will tell some of you of the two parties we all attended in Hamilton, but I'll venture he never experienced the equal of a bottle of champagne via the line from a yacht good enough to tow us from Hamilton out to Fairway."

George Perry attended the National Electric Convention in California in June. — George Thomas wants to be added to the list of presidents admittedly incomplete. The United Shoe Company of which George is a high official has moved its main office to its new building, 140 Federal Street, Boston. — Ralph Whitcomb and Frank Chesterman have both been to Europe this summer and we shall try to secure their impressions. — Ned Jewett has not been with H. L. Stevens and Company for several years. Does anyone know his present address? — Jim Barnes' daughter, Mary Ann, presented flowers to the French flyers, Coste and Bellonte when they stopped in Louisville in the *Question Mark* en route Dallas to New York. — Sid Strickland has been sailing *Widgeon*, one of the Pilgrim Yacht Club ducks this summer, but we have seen no evidence of his having won a race. — A Chinese directory has been published in Boston and Grove Marcy's company didn't have a look in.

Clarke Warren writes: "Ask Bill Green if he can listen to 'Singing in the Bathtub' without recalling the bailiff way back when . . . I am still out of jail and that's about all I can say for myself." Perhaps somebody can explain what this is all about. Bill won't and that looks suspicious. — Bill Motter has a yacht but, alas, she's a power boat. He must be one of those who wants to get there and back. He wrote in May: "Last summer we became gradually convinced that there was no room for us on the present highways. When we reached this decision we took to the water and acquired the *Elsita* which is a 36-foot bridge deck motor cruiser. It is a boat that has a fair record as a racing cruiser, although I do not expect to use it in that way. Last summer I was hoping that we might run up and surprise you, but we did not have the opportunity to get that far away from home."

George Jones wrote in August: "Charlie Dean dropped in about a month ago on the way to Denver, returning from Europe, where he has spent the last six months with his family. He tells me that he sold his interest in the Stearns-Roger Company, of which he was Vice-President, more than a year ago, and intended to retire. However, he now wishes to find some new connection which will keep him busy part of the time after having had a long vacation, and while his family are still in Europe he is hunting around Denver for something to do. If you write him a letter, he could no doubt write you an interesting account of his experiences in Europe, including sailing in the Bay of Naples. (Charlie was promptly appealed to. He replied, "My talents do not run to literary achievements. George is all wrong.")

"We have had two interesting meetings here with Dr. Compton, who was in Chicago most of July. After one of the luncheons Ortseifen and I drove him around town one afternoon, showing him some of the newer developments. We also met his brother at Chicago University, Dr. Arthur Compton, the winner of the Nobel prize. Both of the Comptons were at a subsequent Technology dinner and Dr. Arthur Compton ran off some moving pictures of the inauguration of his brother which were very interesting. I had with me as my guest and client, C. E. Johansson, of Detroit, who happened to come to Chicago that day to see me and he gave the crowd a demonstration of his gauges. You will recall he is the one who makes metal blocks to a millionth of an inch. Ford purchased his U. S. Patent rights some years ago. He has visited Technology and given a lecture in the shops, and was invited to be present at the inauguration as one of the official guests but was unable to attend. I saw in the Detroit papers not long ago that when he returns to Sweden, he will be made a Knight."

George Jones had business in New Haven in September and spent a night with Ros Davis in Middletown. In the morning George recalled that Ralph Hadley had been unable to find a worthy tennis opponent at Oyster Harbors and that the Twenty-Fifth Reunion championship had never been settled. So play was started on the Wesleyan Faculty Club ping-pong court. George was surprised to see how Ros remembered the tricks he learned on his mother's dining room table. He was fast losing his control when a lawford so nearly broke a window that play was adjourned to the university courts. Here George was handicapped by Ros' number ten sneakers which, however, he said were fine for the shuffle that Louie Killion once taught him, while Ros claimed that he was dazzled by the color of George's undershirt. After five games, with the score three all, Ros decided he had some work to do and Mrs. Ros substituted. At four all, George resorted to sleight-of-hand and won the match. Another tennis championship has gone west. — ROSWELL DAVIS, *Secretary*, Wesleyan Station, Middletown, Conn. SIDNEY T. STRICKLAND, *Assistant Secretary*, 20 Newbury Street, Boston, Mass.

1907

In E. Leon Chaffee we have a classmate who has brought honor to the Class and made a name for himself in the field of physics. Leon is a modest man. It is difficult to get him to tell much of his accomplishments, but his name is included in "Who's Who in America." He is a full professor of physics at Harvard University, a fellow of the American Academy of Arts and Sciences, a fellow and past Vice-President of the American Institute of Radio Engineers, a fellow of the American Physical Society, and a member of the Optical Society. He has done a great deal of research work in two lines — the electrical response of the retina under the stimulation of light, and in vacuum tubes, and has delivered many professional papers, the most important of the recent ones being "Direct Measurement of Velocity of Cathode Rays and $\frac{e}{M}$" before the Physical Society meeting at Washington in April 1930. Leon is married and has a son Leon Hampson Chaffee, born December 29, 1929.

Your Secretary wrote a letter of sympathy in behalf of the Class and for himself personally to Harold Farrington in New York City, having seen notice in the Boston *Herald* of the death of Harold's wife on September 1, 1930. — John Frank became President of his company, Ilg Electric Ventilating Company in November 1929. During this year he has been serving as vice-chairman of a Chicago committee for the employment of handicapped persons. He says he considers this very important work. — Stuart Godfrey is Major, Corps of Engineers, U. S. Army, stationed at Fort Leavenworth, Kansas, where he is instructor at the Command and General Staff School. — Another '07 man whose name appears in "Who's Who" is Ralph G. Hudson. Ralph is a full professor of electrical engineering at Technology, has written many text books and professional articles,

1907 Continued

and served in several professional and civic capacities. He is a fellow of the American Association for the Advancement of Science by reason of his contributions to scientific literature. At the Institute he is in charge of the Aldred lectures. With his wife and four children, he lives at 45 Ashton Avenue, Newton Centre, Mass.

Through the courtesy of Professor Charles E. Locke '96 we have the following information regarding L. C. Hampton: "L. C. Hampton, who at last accounts was in Europe on his way back from an extended stay in Australia, and who expected to return to California permanently, arrived home in Los Angeles only in time to be ordered to China by his employer, the Union Oil Company of California. A letter received from him dated August 6, 1930, from Shanghai reported that he had been in China for about two months and had made contact with quite a few Technology men. He said that the Alumni there were more active than in any other place he had visited in his travels, and he enclosed the announcement of the monthly meeting of the Technology Club of Shanghai, which was to be a boat trip, with the Kiangnan Dock members as hosts, for an all day trip of members with their wives, children, sweethearts and friends on Sunday, August 10. Hampton mourned the fact that the only boat leaving for Tientsin that he could get left that same morning, so that he could not go on the outing. In spite of the general upset in China on account of the civil war, bandits, and communists, his party managed to see considerable of the country. He flew to Nanking and Hankow on the Yantze Kiang, and while flying just north of Kiukiang the plane passed over about 150 bandits. He went by train to Hangchow one day and had a very enjoyable time among the temples and monasteries. This region is seldom visited by Europeans since the trouble began with China, and consequently Hampton had an opportunity to see just how the Chinese live without outside influence on their habits and customs. The delegation of which he is a member is making a market survey for oil in China, and Hampton's job is the engineering in connection with the sale and distribution."

G. Edward Prouty is a Vice-President of A. B. Conant and Company, Inc., investment securities at 75 Federal Street, Boston, Mass. — On September 17 Anthony B. Arnold was elected a Vice-President of the American Agricultural Chemical Company of 420 Lexington Avenue, New York City. I am sure the Class joins me in extending congratulations to Arnold on his election. — Your Secretary has little new with regard to himself, being still in the life insurance business in Boston, but the Class members may be interested to know that his oldest son, Bartlett, entered Indiana University at Bloomington, Ind., this fall. — BRYANT NICHOLS, *Secretary*, 2 Rowe Street, Auburndale, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

Word has just been received of the death last May of Arthur K. Mitchell, who fractured his skull as a result of a fall. Mitchell was married, his wife being Eunice Bowser of Victoria, B. C. They have one son, Hoadley Mitchell. Mitchell has been connected with the St. Joseph Lead Company for about 15 years and at the time of his death was assistant to the President of the company. During the World War he was Secretary to the War Industries Board. At the time of his death he lived in Bronxville, N. Y.

Professor Chet Dawes is the author of a chapter on "Electrical Engineering" in the third edition of Marks' Mechanical Engineers Handbook recently published by the McGraw-Hill Company, Inc. Chet is Assistant Professor of Electrical Engineering at Harvard University. — An attractive announcement was received from the Duncan Greens (just too late for the October issue of The Review) celebrating the arrival of Cynthia Ann on July 20, 1930. The Greens now have three children, William Duncan, Jr., 10½ years old, Lora Jenkins, 8 years old and now Cynthia Ann. — William Green writes that he has seen Bernard Fuller a few times and that he understands he has been working for the Trojan Engineering Corporation since last January. — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass. PAUL M. WISWALL, *Assistant Secretary*, General Foods Corporation, 250 Park Avenue, New York, N. Y. MAURICE R. SCHARFF, *Assistant Secretary*, First National Bank Building, Pittsburgh, Pa.

1910

Not a letter or clipping came in this month, in spite of the enthusiastic gang that gathered last spring and was going to get writer's cramp corresponding with your Secretary. Frank Bell suggests that the only way to get material for notes is to write to a number of classmates every month. This will be tried so if you get a letter asking for news, please sit up and take notice and we'll try to make this column a live one. I ran into Arnold Davies the other day, after having talked over the phone with the sales manager of the Blackmer Pump Company without knowing that I was talking to a classmate. Arnold is just the same as ever, and has an office in Cambridge. — DUDLEY CLAPP, *Secretary*, 40 Water Street, East Cambridge, Mass.

1911

It's Farmer Denison now, by heck, for your Secretary has decided to stay with this new Douglas Inn property right through 12 months. With a housekeeper and caretaker, man and wife, in attendance and heated cottages available, we can accommodate guests interested in winter vacationizing on application. So when you feel the urge, w-t-D and make reservations. There is wood to be cut here, ice to be harvested, and many repairs on the property which will keep a Technology man busy. September is almost over as these notes take form and but one other '11 man has been here, George Estes, II, of Auburn, Maine, and his wife and youngsters. However, there are other years coming.

We all sympathize deeply with Jim Campbell, I, who lost his father, Mr. Daniel W. Campbell, this late summer, the latter dying at his son's home in White Plains, N. Y. — Notice from the Alumni Office tells of the return of F. C. Harrington, I, from Cheyenne, Wyo., he being now located at 46 Jamaica Road, Brookline, Mass. — With great pride we learn that Gordon Wilkes, II, has been advanced from the grade of Associate Professor to Professor in the Department of Physics at Technology. This is a well merited advancement, Wilkie.

If you have not answered the '11 Twenty Year Reunion questionnaire by the time you read these notes, please let this closing be a reminder to you to do so at once. We want a banner attendance at this 1931 Reunion of our Class and exact dates and location will be announced pronto! — ORVILLE B. DENISON, *Secretary*, Douglas Inn, Douglas Hill, Maine. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

Way back in 1918 just after our benevolent Uncle Sam had turned us back to the tender mercies of a grateful country, we were on our way south to Mobile, Ala., to try to make friends with a civilian job again. On the train, we met a classmate, also on his way to a new job. In his case it was to New Orleans. Then our paths and lives separated until chance brought us together again this fall in New York, and at this meeting W. G. Cole, I, gave us the high spots of his story since graduation.

Right after the Institute authorities handed him a few square inches of parchment with his name lettered on it, Cole headed back to his home town, Baltimore, Md., where he went to work as a draftsman for the Baltimore Sewage Commission. Seems as though there was something ironic about that, he says, for in our class in sanitary engineering Professor Porter always held up Baltimore as a horrible example of sanitary conditions. Just what Cole did to improve those conditions is not clear, but anyhow he got to be assistant designing engineer before he quit the sewage business and got himself a job with the Maryland Steel Company. And this is where the safety movement first took hold of W. G. Cole.

Somehow or other he got interested in this safety — first, second, third, and always movement — and from there on he's been in one kind or another of engineering work in connection with safety. He was with the Bethlehem Steel Company when rush work on war contracts plus green and inexperienced help made steel mill operation almost as dangerous as the dugouts of France. He was next with the Southern Pine Association in New Orleans and later with the United States Chamber of Commerce in Washington, D. C. Five years

1912 Continued

ago the great Metropolitan Life Insurance Company wanted a Director of Safety for their Policy Holders Service Bureau. What was more natural than they should find a Technology man for the job? W. G. Cole had the training and the experience that fitted him for the job. And so the other day we found him occupying one of the private offices on the sixth floor of the Metropolitan Life Insurance Building at Madison Square. His safety work, he explained, is largely in connection with industrial plants and concerns which carry group insurance policies. Then too, there are interesting things such as making a traffic survey in Atlanta, Ga., as a result of which there was developed a model traffic plan for other cities to use in studying their own conditions. The insurance company's interest in such civic matters as traffic control, is not philanthropic, of course, but with a business eye to the reduction of mortality to the population in general, and the policy holders in particular. Cole does a lot of traveling in this job of his. Since our stay in Mobile, we have always had plenty of kind words to say for the girls of the Gulf Coast region, and W. G. Cole feels the same way. He married one of them. Since they have moved North, he claims she is quite weaned away from her love of New Orleans. Little Neck, Long Island, where the Coles now live isn't much like New Orleans, but it's a pretty nice place at that. Cole has three children — two boys and a girl.

Page Golsan, VI, called us up one day not so long ago. He promised to send us full details by mail, but so far the promised letter is missing. Anyway, we found out that he is manager of the new business department of Ford, Bacon and Davis, 165 Broadway, New York. He has something to do with natural gas developments, we surmise. Perhaps we'll get him to attend some New York luncheon meeting and tell us something more. — From Mrs. Hammerstrom, we learned that her husband, William G. Hammerstrom, II, has been ill. No details were given in her letter, dated August 5, and we know we speak for the entire Class in expressing the hope that he is now entirely recovered. The address given was 7 Vista Avenue, Lynchburg, Va.

Another classmate, B. H. Morash, VI, has also been on the sick list. His trip to Japan last spring must have been too much. At any rate we've had a couple of brief notes from him saying he's been taking it easy and recuperating the past summer at Hurley, N. Y. (near Kingston). He reports that Harold Brackett, VI, has been up to see him. — A note from John Hall, XI, Freehold, N. J., is devoid of all details about himself, but he promises to be on deck for the 1932 Reunion. — P. T. Redfern, IV, is sales manager of the Byers Machine Company, Ravenna, Ohio, manufacturers of contractors' equipment, shovels, cranes, and so on, but at this point his modesty gets the better of him, and his letter fails to give us any more news. — Appealing letters (appeal for news and not money) have been sent to G. M. Keith, I, W. C. Lynch, II, E. T. Marceau, X, D. F. Benbos, II, and F. H. Busby, VI, but no acknowledgment has ever been received. If anyone knows how to get in touch with these men, please try and stir them up to write us. — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown, Mass. DAVID J. MCGRATH, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 10th Avenue and 36th Street, New York, N. Y.

1913

Here we are, back again after an uneventful summer. Except for the June festivities, '13 men have not been seen around the Institute. As a matter of fact, not many appeared in Cambridge during the Open House or for the inauguration of Dr. Compton, although the dinners brought out several new faces. Your Secretary was very much tied up at the Registration desk during the Reunion and could not give as much time to returning classmates as he wished, but the receptions were continued at the Class and Alumni dinners which followed.

The best group we have assembled for some time appeared at the Class Dinner at the Parker House on June 6. Charlie Thompson, Joe Cohen, Wardwell, Muther, Burt, Bion Pierce, Mattson, Audrey Burnham, Portal, Al Brown, Eichorn, Gustin, Hartnett, Brewster, Fessenden, Butsey Bryant, and Townsend were there. The dinner itself was, in the opinion of all, the best meal they ever had or expect to have. All credit to Mr. Walker of the hotel. In spite of the extreme heat, everybody had a fine time. Butsey showed the class films of the Fifteenth Reunion, and Al Townsend told several facts and fancies about the Institute in general, and student life in particular. Let us not forget that since the dinner was stag, our coed representative, Effie MacDonald, now Mrs. Norton, attended the women's dinner at the Statler. Many at the Class Dinner later went to the Statler and joined the ladies at a late dance.

A large crowd of '13 men and their ladies appeared at the outing at Swampscott. Some only dropped in for the day, but we were very glad to see our old friends. Among those present were: Mr. and Mrs. Butsey Bryant, Mr. and Mrs. Phil Burt, Mr. and Mrs. Mattson, Mr. and Mrs. Arthur Hirst, Mr. and Mrs. Darling (this quartet making their first appearance at any Class affair), Mr. and Mrs. Ready, Mrs. Norton, Bill Brewster, Wardwell, Harty, Eichorn, Thompson, and Townsend. Franzheim and Atwater were seen about the grounds but didn't appear to be much interested in '13.

The Alumni Dinner proved to be the bonanza for an outpouring of '13 men. Seen at the tables in the Statler were: Mr. and Mrs. Mattson, Mr. and Mrs. Bryant, Wardwell, Howie, Mr. and Mrs. Ready, Mr. and Mrs. Hession (first appearance), Mr. and Mrs. Gustin and Master Gustin, Mr. and Mrs. Audrey Burnham and guests, Thompson, Brewster, Mr. and Mrs. Al Brown, Mr. and Mrs. David Stern, Mr. and Mrs. Oppenheim, Mr. and Mrs. Cohen, Mrs. Norton, Rand, Muther, and Townsend. Mr. and Mrs. Joe MacKinnon sat at the faculty table. Several others around Boston sent word of possible attendance but they failed to appear. While we are much pleased at seeing this large group, with the number of classmates residing around Boston, the attendance should have been two to three times as much.

Joe Cohen is running the Atlantic Gelatine Company out in Woburn. He apparently uses some of his own products, for he hasn't lost very much weight. — Bill Brewster now helps out the Treasurer at the Plymouth Cordage Company, and spends some little time on the road. — George Bakeman is now assistant to Selskar Gunn who heads the Rockefeller Foundation in Europe. He lives at St. Cloud, speaks French like a native, is married, and has two girls aged 10 and 7. How about some news from Paris, Bakeman? — Allen Brewer is a mechanical engineer for the Texas Company with offices in the Chrysler Building, floor not given. He has been married ten years. — Among the youngest bridegrooms is Lee Bowman, now with Stevens and Lee in Boston. Bowman has been married just a year, and, as you all know, is an architect. — Milwaukee is the home of M. P. Allen. He is Secretary of the Hunter Machinery Company. — Dave Stern is running the National Can Company in South Boston. — Miss Frances Stern is chief of the Food Clinic at the Boston Dispensary. She has written a book and several magazine articles on her specialty — food. She teaches some at Tufts and at the Institute. — Frank "Jumbo" Mahoney has left the Everett Distilling Company and is now with Howe and French as chemist at the plant. Good luck, Jumbo, in the new job.

News comes to your Secretaries very slowly, and generally through very devious channels. Nothing is better than a short crisp note telling us what's what and why. Just loosen up and write this winter. Your classmates like to know what you are doing. — GEORGE P. CAPEN, *Secretary*, 50 Beaumont Street, Canton, Mass. ARTHUR L. TOWNSEND, *Assistant Secretary*, Room 3-435, M. I. T., Cambridge, Mass.

1914

During August your Secretary started off on one of his annual peregrinations and had the pleasure of meeting three '14 men. In Holyoke, he stopped to see Jimmy Judge and to learn of some of the worries of a paper manufacturer in dull times. Jimmy was still smiling, and pretty well recovered from the June Reunion.

Passing along the Connecticut Valley in Vermont, the air suddenly left one of the Secretarial tires. While making the necessary shift, who should appear from out of the neighboring hills but Porter Adams. It is needless to state that wanderings for that day ended then and there. Pat had his old-time line, and was at his best. He promised to rest again this winter, and will undoubtedly return to the southwest.

1914 Continued

At Kennebunk Beach, Maine, there appeared a third classmate. Here Dean Fales has spent the summer regaining his health and sight. We all know the old story of the blind man when the fair lady passes by. Dean has been strengthening his eyes by daily walks along the beach. From what your Secretary saw in a single day, Dean's eyes should be ultra strong after a whole summer of exercise. A full report of the summer's activities will be made by Dean at one of our luncheons this winter. Dean has returned to Technology again this year as Associate Professor of Automotive Engineering.

I was not the only visitor to Kennebunk Beach last summer. Late one evening a tramp appeared via the kitchen door at the Fales home. After much excitement and threats of calling the police, the tramp removed his disguise and there stood Boggs Morrison. Dean claims the deception was possible only because of his bad eyes, but we have it on good authority that Dean swallowed the bait, hook, line and sinker, much to his personal disgust and Boggs' delight. Peace was soon restored and the impromptu '14 reunion continued smoothly without further interruption.

Walter S. Hughes called on me at the office recently. Hughes is back in Boston after a three-year visit to England, which included studying at Oxford University. — Harry M. Wylde was one of the Lever Brothers organization to be selected from the Cambridge plant to be placed in charge of a larger scope of work in connection with the new plant at Hammond, Indiana. We shall miss him at our Boston luncheons, but wish him the best of success in his new activity. — Another patent has been issued to Joseph W. Horton as the result of his former work at the Bell Telephone Laboratories. This time it is on apparatus for television. — Harold B. RICHMOND, *Secretary*, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, *Assistant Secretary*, 21 Vista Way, Port Washington, N. Y.

1915

Since these notes are going in on September 25, it is too early for the deluge of letters I expect from you all after you've read the October issue of The Review containing the account of our Reunion. So this month's column will give you some of the pre-Reunion reactions. But first, in answer to several requests, I shall give you the names of the prize winners at the farewell Reunion Dinner. As funny as some of these may seem to you, nevertheless you can hardly appreciate the full humor and burlesque without Gabe Hilton's appropriate remarks and a description of the prizes, both necessarily here omitted. Long distance, Harvey Daniels, I, who came from Yokohama, Japan; second long distance, Fred Waters, II, who walked from his home in nearby Marblehead; best musician, Bill McEwan, II; laziest guy, Henry Sheils, I; best golfer, Archie Morrison, II; worst golfer, Chet Runels, IV; most eligible bachelor, Mitch Kaufman, X (there are only a few of us left); best drinker, Easty Weaver, XIV (very funny); worst drinker, Wilbur Swain, VI (terrible); baldheaded prize, Frank Scully, I; most children, St. Elmo Piza, IV (very, very funny and it broke up the dinner).

On Saturday evening, June 7, from Salisbury, England, Clive Lacy, VI, cabled "Greetings to 1915." Clive had planned to be with us but sailed unexpectedly the latter part of May. On Sunday Arthur Ball, VIII, wired from Hollywood, Calif., "With you in spirit."

Here follows some letters from active classmates who unfortunately could not come: From Jim Tobey, IX: "I have delayed answering your fervid epistle until now as I was hoping to be able to attend the Reunion, but I find that urgent business reasons will absolutely prevent. Will you please give my best regards as well as my regrets to everybody who is present?" — From Douglas Baker, VI: "The attached copy of a letter to Frank Scully is self-explanatory. I should have answered your letter of March 29 long before but I have put off making a definite renunciation of a trip home for the Reunion as long as possible. Last week I saw Phil Alger for a few minutes. He will be here again this week and I shall ask him to give my best wishes to the rest as he expects to be back in time for the Reunion."

Here is the letter that Baker wrote to Frank Scully: "This is to thank you for your letter of April 12th concerning the Fifteenth Reunion in Boston this coming June. Up until Christmas time I fully expected to make a visit to the States this year, the principal reason being to take in the Reunion. However, at the end of November I was transferred from Madrid to London where the European General Staff is located. The new job is my first experience outside a 'line' company and I find the work very absorbing and interesting. One transplanting of this kind is all a delicate flower like myself can stand in one year, and consequently I am not planning to pay a visit to the States at this time. I suppose I shall have to begin thinking about the Twentieth Reunion five years hence. London is alittle bit nearer to the usual line of march of people visiting Europe, and I sincerely hope that anyone from the Class who is coming through this city will look me up. While the Headquarters are in London, I do not expect to be here a great deal of the time, as my present job will mean a considerable amount of travelling. I am rather looking forward to this since, up to now, my travelling has been extensive but has only covered Spain and the connecting lines to Paris and London."

From Ted Spear, X, the following letter: "You are quite right in what you say in your letter of May 28th, that I have not been around since I graduated, and much water has gone under the bridge since then. I appreciate it very much indeed, your writing to me, but I can't tell you how sorry I am that I am going to miss the Reunion this year. I suppose nothing outside of a death or birth should interfere, but I have something on which has been planned for very nearly a year, and it was impossible to change the dates and there was nothing left to do but go through with it.

"Although for the past 11 years I have not been very far from Boston, I have really not seen many of the crowd. I did meet Kaufman on a New York train a few weeks ago, and he seemed just the same as ever or possibly little more bowed down with care than when I last saw him before. I presume, however, all of us are in that condition. I know you are going to have a wonderful time and you can be sure were it possible in any way to get down to any part of the celebration that I would be there this year, but the breaks were against me. There isn't much to say about myself; married, two children, and playing golf and fishing when I'm not working. Be sure to remember me to everyone and if any of you are ever up this way, and you should come, don't pass through without letting me know."

The following letter from Leslie Fletcher, II: "I am extremely sorry that I am not going to be able to be present at the Fifteenth Reunion of '15. If by good fortune the opportunity presents itself to attend, I will immediately get in touch with you. Please give to all my friends my regards and my regrets in not being able to slap them on the back and renew old acquaintanceships. Best wishes for a successful Reunion." — From Lloyd Chellman, I: "Thanks for your note of May 24. My absence from the Reunion this year isn't a case of crawling into a shell but is due to a combination of circumstances that I am unable to control. Hope the affair will be a huge success. Best regards."

Louie Young, II, wrote afterwards: "The Reunion was surely worth it. Henry Shiels and I had a continuation of the Class party on the following Friday in camp at Moro, Maine." From the start they had, it's easy to guess how they finished! I think the prize literary contribution is from gay old St. Elmo Piza, who wired me personally: "I mailed my card ten days ago. Tell Frank I shall be there on time Friday with no ladies, automobiles, nor impedimenta of any sort except a hangover from the boat ride and a great longing to see '15 through another crisis." And he did! Please note my new address next door to the old one. — AZEL W. MACK, *Secretary*, 379 Marlboro Street, Boston, Mass.

1916

Your Secretary regrets that he has received no letters from Class members during the past month. He has been too busy to send out requests for news, since he has been trying to supply the needs of the many million miniature golf players all over the country. How long this racket will last, nobody knows, but it is great for the poor golf ball manufacturer while it does. Here's hoping for some newsy notes for the next issue. Sit down and drop me a line now. — HENRY B. SHEPARD, *Secretary*, 269 Highland Street, West Newton, Mass. CHARLES W. LOOMIS, *Assistant Secretary*, 7338 Woodward Avenue, Detroit, Mich.

1917

S. S. Batchelder came out of his cave for the first time in seven or eight years and called on several members of the Class during September. For a long time he has been connected with the Barre Wool Combing Company of Barre, Mass., but his responsibilities and long hours there have been such that he has done very little traveling except for two trips to Europe. During his tour of eastern Massachusetts, he found H. N. Keene of the Plimpton Press recovered from a long spell of ill health experienced late last year. Keene is now a director of Plimpton Press.

From Akron via Newburyport, Mass., comes the following item: "Of particular interest in social circles of Akron is the wedding of Helen Shaffer Ruttman, daughter of Mr. and Mrs. Ralph Shaffer of 531 Sunset View Drive, to Arthur Raymond Knight, son of Mr. and Mrs. Franklin P. Knight of Newburyport, Mass., which was solemnized Thursday evening, July 3. Mrs. Knight is a graduate of the University of Akron. She has been case supervisor for the Family Service Society of welfare work for Akron and vicinity for the past few years. Mr. Knight is assistant manager in the Near East department of the export branch of the Goodyear Tire and Rubber Company, comprising Spain, Italy, Malta, Gibraltar, and so on. He was a night bomber in both the French and Italian flying corps during the World War, with 104 expeditions into enemy territory to his credit, and was awarded the Croix de Guerre with two citations." — RAYMOND S. STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

1918

The well known investment house of L. Sherman Adams has lost the services of Grenny Hancock, who is now with Jackson Curtis just to demonstrate that 1930 is his year. Grenny has become a director of the Evans Auto Loaning Company of Detroit.

After the illusiveness with which the New York crowd escaped the spring visitations of our class, it is a joy to chronicle the luncheon given last June by the Gothemites and attended by Gretchen. — In the to have and to hold paragraph we enter Julian Avery. A study of electrochemistry arranged his magnetic cells in such a pattern that relinquishes bachelorhood only after a round dozen years of immunity to electromotive forces. At St. James Cathedral, Toronto, on October 4, he came down the aisle with the girl who had walked up it as Jean Grant Francis. Solid silver is in order and may be addressed to Elton Hall, Scarsdale Manor, Scarsdale, N. Y. — F. ALEXANDER MAGOUN, *Secretary*, Room 5-328, M. I. T., Cambridge, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, 51 Houston Avenue, Milton, Mass.

1921

Since our vacation has seriously interfered with the chronicling of Class affairs for this and the last issue of The Review, these notes will be limited to a very brief description of our doings at the All-Technology Reunion last June. A Class Dinner was held at the Hotel Statler with 42 in attendance. During the business meeting following the dinner it was decided that '21 should hold a special Ten-Year Reunion in June 1931, and that a committee be appointed to take charge of the affair. Flashlight pictures were made of the gang and then followed a general bull session which lasted far into the night.

Saturday brought a good sized crowd to the outing at Swampscott but golf and Professor Richards' archery attracted so many of our number that only 21 were left to march behind the Class banner in the parade. In the evening we had an attendance of 36 at the banquet held in the Statler. Sharing the sad fate of several other classes, we were seated in the foyer outside the ballroom and so missed most of the events staged for the lucky ones inside. Nevertheless, the usual good time seemed to be had by all. Following the dinner some of our crowd were lost in the general riot which marked the removal of the tables from the hall but enough of us remained together to have another party after the speeches.

The big '21 family at the Reunion included: E. T. Adams, A. D. Addicks, W. W. Anderson, L. B. Barker, J. W. Barriger, Maurice Basinow, F. W. Binns, E. W. Booth, Mr. and Mrs. E. R. Clark, Mr. and Mrs. O. W. Clark, Mr. and Mrs. C. A. Clarke, Mrs. Louis Clarke, J. D. Crosby, Mr. and Mrs. E. N. Dubé, R. E. Ferdinand, E. B. George, Mr. and Mrs. P. L. Hanson, A. D. Harvey, J. G. Hauber, Mr. and Mrs. L. M. Hersum, J. L. Hurley, Joseph Hurburt, J. T. Hull, Norman Insley, Mr. and Mrs. A. C. Jenson, A. J. Johnson, J. G. Kaufman, A. J. Kiley, W. L. Knoepke, Mr. and Mrs. H. R. Kurth, Mr. and Mrs. H. M. Lane, Mrs. M. B. Lees (or own Connie Nelson), G. H. LeFevre, Joseph Lurie, E. J. MacDonald, Richard McKay, Charles MacKinnon, A. D. Maclachlan, E. I. Mandell and guest, O. A. Mills, O. F. Neitzke, P. A. Nelles, Jr., A. W. Norton, L. C. Pelkus, A. E. Povah, Larcom Randall, F. L. Raymond, W. C. Ready, F. M. Rowell, Mr. and Mrs. R. A. St. Laurent, J. M. Sherman, S. M. Silverstein, E. R. Stewart, George Thomson, J. L. Vaupel, G. T. Welch, H. A. Wexler, C. A. Williams, and R. P. Windisch. — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Mfg. Company, South Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, Bell Telephone Laboratories, Inc., 463 West Street, New York, N. Y.

1923

There having been no stampede of volunteers to take over the job of Secretary of the Class which Bob Hendrie recently reluctantly relinquished, the Assistant Secretary has apparently succeeded to the job. What he will do with it remains to be seen. Bob's service in the position has been more noteworthy than many of the Class may realize, as his has been the responsibility of scraping up Class news during the early years of our post-graduate experience, when important news about any of us was decidedly rare. Now that most of us have more or less established ourselves, the period when we can make our dent in the surface of human affairs has begun.

For example, there will be items to record of which the following is typical. *Time* magazine reports the merger of G. P. Putnam's Sons, oldest U. S. publishing house, with Minton, Balch & Company, another publishing concern. In this merger Palmer C. Putnam played a leading rôle. Putnam is a Course XII man and has since graduation stuck closely to his profession — Geology. The death of his father, Major George Haven Putnam, last winter passed an important block of stock in the C. P. Putnam Son's firm to the son. Coming back from Africa recently *Time* reports that Geologist Putnam found it up to him to decide the future of the firm. This he did by buying out his cousin, George Palmer Putnam, and arranged the merger to bring new blood in to fill an executive hole. The departure of George Palmer Putnam from the concern seems to have aroused as much comment as the merger itself, as he had made quite a name for it as a publisher of explorers' stories, among them such famous persons as Commander Byrd, William Beebe, and Mrs. Martin Johnson. The new firm will be known as Putnam, Minton and Balch, and Palmer C. Putnam will be Treasurer. Whether this means that he will forsake professional life for business is a matter on which we must await direct advices from Putnam himself.

There seems no doubt that many members of the Class are doing or have recently done things of interest to others in the Class. I hope that false modesty will not prevent any of you dropping a line to the Secretary telling about them, or about interesting things you know other '23 men are doing, but who may be relucant to write about it. Each of you, on reading this, should imagine that you have been listening to a class pep talk, work yourselves into a lather, and, fired with enthusiasm, sit down and prepare that account of your life which you have probably secretly suspected the world was waiting for. Then there will be something with which to fill these columns.

A clipping from the Gardner (Mass.) *News* tells of the engagement of Miss Alice A. Greenwood, supervisor of public health nursing of the Gardner chapter, American Red Cross, to Chester O. Avery of Milford, Mass. Avery is working for the Draper Corp. in Hopedale, Mass.

A few other scraps of information are available from address changes which have been reported to the Alumni Office. You will be obliged to guess what they mean. Russ Conant, who has been at the Institute, is now addressed at the Technicolor Motion Picture Corporation, Hollywood, Calif. — Flossie Harmon's address has been care of the U. S. Steel Products

1923 Continued

Company in the Russ Building, San Francisco. An address change reports that his connection is with the Columbia Steel Company, but his address otherwise is the same. — Charlie Keevil has moved from Arlington, Mass., to Corvallis, Ore.; Forrest Lange from Rutherford, N. J., to Buffalo, N. Y.; and Charles Lermond from Providence, R. I., to Elizabeth, N. J. — Donald H. McNeal has moved from Denver to Evanston, Ill.; Raymond Reuter from Philadelphia to Freiburg, Germany; Charles H. Robinson from Hudson, Mass., to Toledo, Ohio; and Sherman White, Jr., from Boston to Tiffin, Ohio.

Information from his mother reports the death of Daniel J. McCarthy of New York City on July 7. McCarthy came from Lawrence, Mass., and following graduation was for a time a patent examiner at the U. S. Patent Office at Washington. He went to New York in 1926. Unfortunately, I lack data as to what he was doing at the time of his decease.

Does any ambitious classmate want a job? That of Assistant Secretary of the Class is open. — HORATIO L. BOND, *Secretary*, 31 Concord Avenue, Cambridge, Mass.

1926

In a recent letter C. A. Harrison, colloquially known as Dave, divulged that he was married on August 28 to Miss Fannie Collins at Saranac, New York. He is now living in Amityville, L. I., and he is in charge of the Fairchild Aerial Camera Corporation sales, in addition to writing advertising for the Fairchild Airplane Manufacturing Company and the Fairchild, Ltd., of Montreal. A veritable Poobah with wings. — Another '26 man has recently distinguished himself in architecture. Barnett S. Gruzen has won the Rotch Traveling Scholarship for 1930 and this fall he is sailing for Europe. The Rotch Scholarship provides $3,000 payable quarterly over a period of two years while the winner is traveling abroad.

I failed to mention last month that Sid Brookes was added to the committee on the 1926 Reunion which comes next June. Sid will be a stable post on which to lean during preparations for that event. — Dave Shepard's telegram of regret at his inability to be present at the Reunion last June is being kept in the Class archives. — J. RHYNE KILLIAN, JR., *Secretary*, Room 11–203, M. I. T., Cambridge, Mass.

1928

Joe Parks mailed a brief letter from New Rochelle, N. Y., where he is working for the E. L. Patch Company, manufacturing chemists of Stoneham, Mass. Joe is now doing some sales development work for the Patch Company.

We extend the congratulations of the Class to John B. Russell, Jr., Course VI, who was married to Miss Mary Cummings Merry on September 20, 1930, in Watertown, Mass.

The Lampman Chapel of the Union Theological Seminary in New York City was the scene of the wedding of Miss Olive Frances Olmstead and Newton S. Foster, Course II. The happy event took place on September 5, 1930.

Herny C. Buntschuh, Course XV, and his bride, the former Ethel Mae Sugg, are now living at Dinamita, Durango, Mexico. They were married on September 6 in Torreon, Coahuila, Mexico.

Bill Hammond is now Assistant Supervisor of Track at Woodside, N. Y., on the Long Island Railroad. Bill has been in some railroading job since graduation. His first job was with the Pennsylvania Railroad in New York City and later he was sent to Phillipburg, N. J.

Henry "Nap" LaCroix became engaged to Miss Gertrude Day of Newark, N. J., sometime during August. Both La Croix and Jack Hawes are working with the Tidewater Oil Company in Bayonne, N. J. — GEORGE I. CHATFIELD, *Secretary*, Room 11–203, M. I. T.

COURSE I

The day after I mailed the July notes to The Review, Hal Porter and I got an apartment together. At that time I managed to get our new address printed at the end of the notes, but nothing more. Needless to say, Hal and I have a great time in our new place and would like to have any of you fellows drop around when in New York. We've also thought of trying a get-together for the 20 or so Course I men here in town, but this is a busy place and it is not so easy to carry out that scheme.

A few days after the July issue arrived, I had a letter from Peterson giving his corrected address as Box 526, Barre, Mass. As that was some months ago, I may be due for another correction when Ken reads this. At any rate, back in July, Ken had been working for about a year as tunnel inspector on the Wachusett to Coldbrook water supply tunnel. — I was very pleasantly surprised about a month ago when I bumped into Jake Jameson here in New York. As most of you probably know Jake went to Bingham, Maine, the September after graduation to work on a 135-foot high earth dam. He was there about a year and was busy most of the time studying the difficulties of carrying the concrete core wall to rock at a depth of 70 feet. Then he went back to California, then wandered to Mexico City for about three months on the construction of another dam, and for another three months he worked on an arch dam in California. In July Jake came on to New York and is now working for Starrett Brothers on a large concrete and steel warehouse. Another round of congratulations is in order, for Jake is to be married in October. After that big event I shall be able to give you his permanent address. Incidentally, in our conversations we have wondered what Bill Erickson is doing. We know that Bill assisted Professor Barrows last year and took his Master's degree in June, but know nothing of his more recent history. What about it, Bill?

Dave Mathoff dropped in on me early in September. He is in Boston in the engineering department of the Grid Flat Slab Corporation at 761 Dudley Street, specializing, as the name of his company implies, in the design of concrete buildings using the grid system. Dave told me that Al Daytz is now working for Stone and Webster. When last heard from, Al was with the Boston and Maine, so we are looking for the details of his new job directly from him. — GEORGE P. PALO, *Secretary*, 1095 Jerome Avenue, New York, N. Y.

Technology Association of Northern California

As a result of the ballot referred to in last month's issue of The Review, it was decided to have a table reserved at the Engineers Club, 206 Sansome Street, San Francisco, for luncheon each and every Tuesday. These luncheons are entirely informal, each man coming when he pleases, leaving when he pleases, and paying for his own lunch. Incidentally, he may talk about whatever he pleases to whomever he pleases, provided only that the other person also pleases.

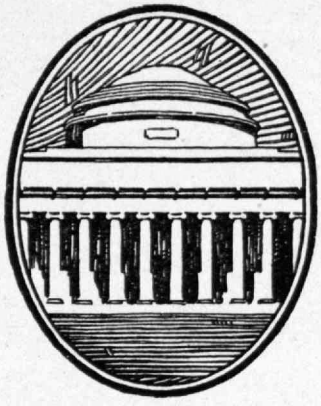
The first luncheon was held Tuesday, September 16. Any Technology men in the vicinity are invited to drop in any Tuesday noon and join in the discussions, arguments, and general rag and food chewing. Sixteen were present on the 16th. Arguing from this there should be 23 on September 23, and 30 on September 30. October will be a new shuffle and deal, perhaps starting wit the final 30 of September and adding the number indicated by the October date. Here's hoping — JOHN K. HELLER '16, *Secretary*, c/o Ford, Bacon and Davis, Inc., 58 Sutter Street, San Francisco, Calif. Telephone Douglas 6270.

The Technology Club of Cincinnati

The Tuesday luncheons of the club at the Hotel Havlin were maintained throughout the summer, and despite vacations there were always several members gathered together to enjoy their good fellowship. The fall season, however, opened with a bang when the American Chemical Society came to town in convention and some 30 odd Alumni from various parts of the country attended the club luncheon Tuesday, September 9. Charles G. Merrell '88 and Stuart R. Miller '07 were the local chemists responsible for rounding the Technology contingent, which was moreover honored by the presence of two men of the Institute staff, Professor Samuel C. Prescott '94 and Associate Professor George Scatchard.

This year the club has another local man at the Institute taking advantage of the Richard Warren Proctor Scholarship Fund. It is a pleasure to report also, that the sons of several of the local Alumni are entering the Institute this year and that Cincinnati will be well represented. — WILLIAM V. SCHMIEDEKE '12, *Secretary*, The Penker Construction Company, 1030 Summer Street, Cincinnati, Ohio.

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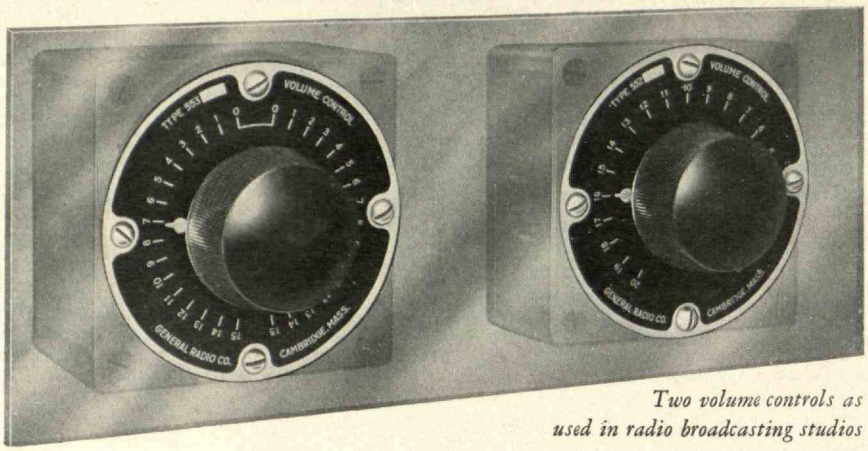
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All inquiries sent to the address below will receive prompt attention

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